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DEPARTMENT OF THE ARMY TECHNICAL MANUAL

PROFESSIONAL MANUAL FOR NURSING SERVICE

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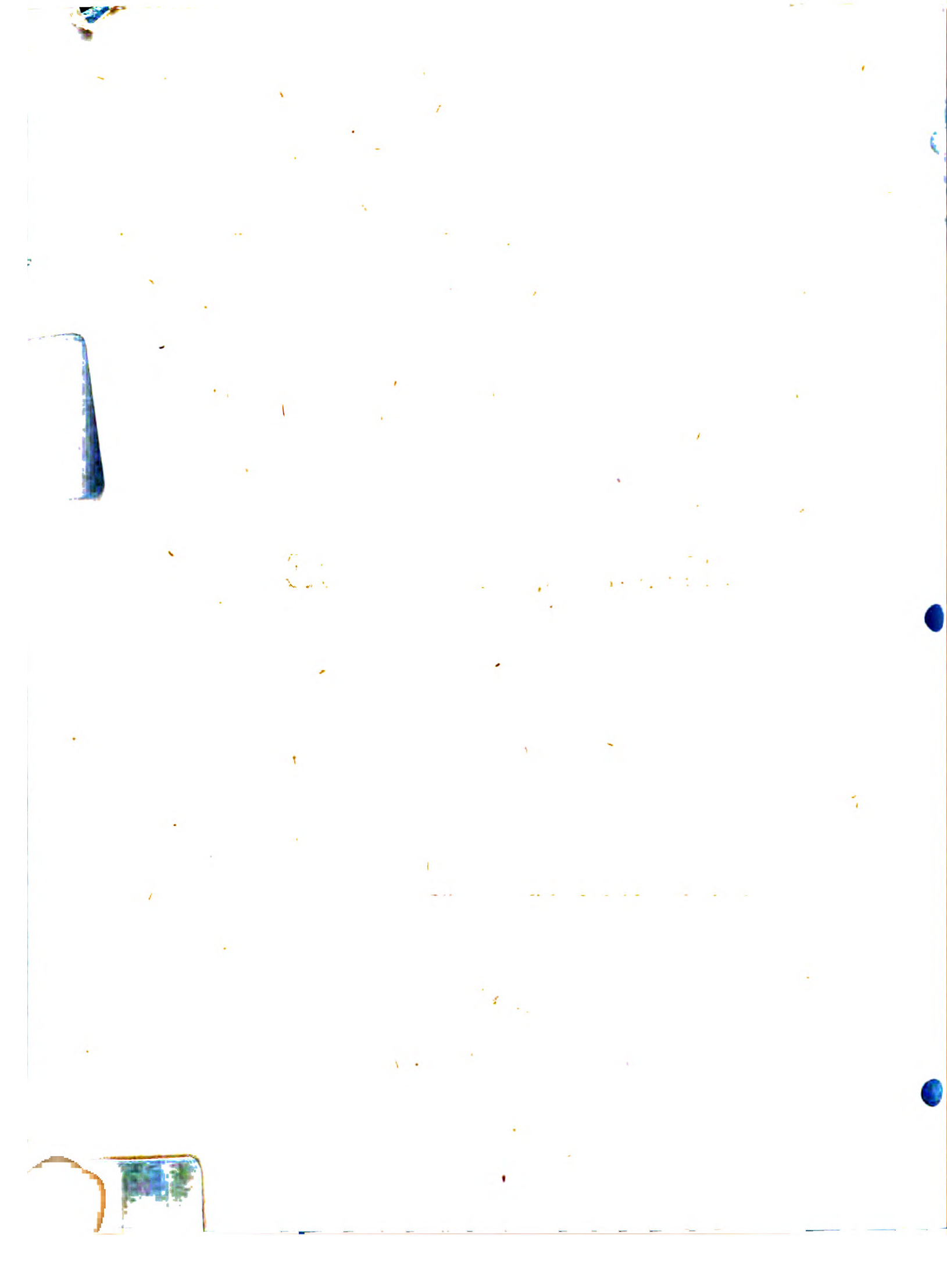

TECHNICAL MANUAL
No. 8-273

DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *27 November 1953*

PROFESSIONAL MANUAL FOR NURSING SERVICE

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Section I. INTRODUCTION

The purpose of this manual is to provide a guide for standard practice instructions on procedures and techniques performed in the care of patients in Army Medical Service Treatment Facilities in the Continental United States and overseas.

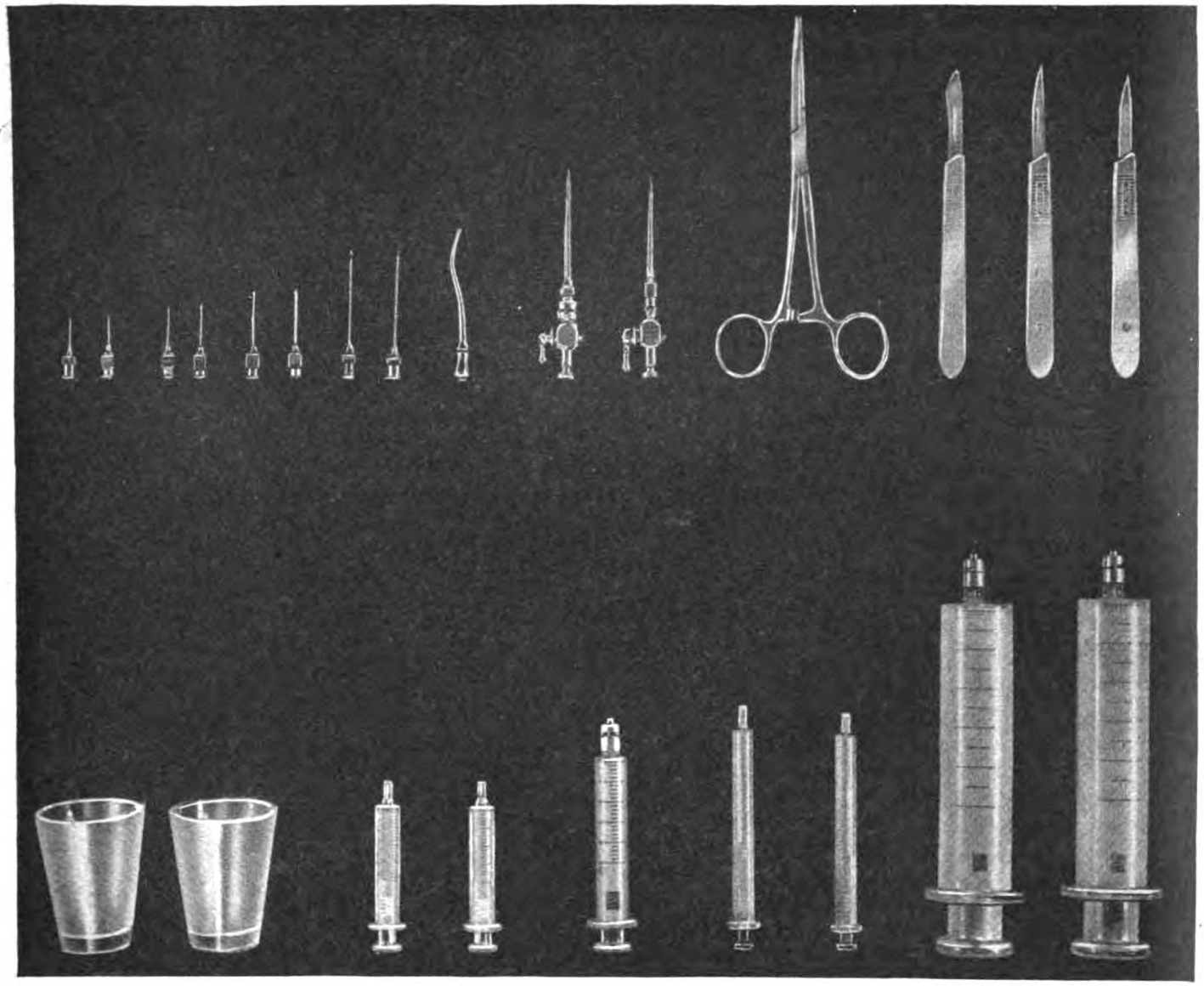
This PROFESSIONAL MANUAL FOR NURSING SERVICE is prepared for the professional nursing staff, but it is not intended that its use be restricted to that group alone.

For the purpose of this manual, procedures and techniques are interpreted as any measure—diagnostic, therapeutic or nursing—which is done for the restoration of the physical and mental health of patients. While a nurse may not be called upon to assist with the actual performance of some of these procedures, she is the professional member who prepares the patient for the test or treatment. She is also the one who observes and reports his reactions so that his progress can be evaluated. It was with this in mind that the materials in this manual were selected.

The contents represent, for the most part, clinical procedures and techniques which are used in one or more services or sections and those which are used generally throughout the hospital. No attempt has been made to include all of the special procedures of the services and clinics.

The general format adopted for the manual was selected because it lends flexibility for presentation of the material. The section, "General Instructions," was used to outline the administrative aspects relating to each procedure—such as, the number of forms required and how appointments are made. The two-column arrangement of materials makes it possible to draw attention to underlying principles or make appropriate interpretations. In some procedures of a highly technical nature only a summary is included. This was done so that the nurse would understand her responsibilities in the post-treatment care.

The pictorial presentation of equipment and sterile supplies affords the means to show graphically the articles needed for each procedure and indicates how equipment is to be used. It is also intended to foster the use of proper terminology in ordering supplies and equipment.



ANGIOCARDIOGRAPHY TRAY*

2 medicine glasses.
2 syringes, 2 cc.
1 syringe, Luer-Lok, 5 cc.
2 syringes, tuberculin, 1 cc.
2 syringes, Luer-Lok, 50 cc.
2 needles, hypodermic, 26 G, ½″.
2 needles, hypodermic, 23 G, ¾″.
2 needles, hypodermic, 22 G, 1½″.
2 needles, hypodermic, 19 G, 2″.
1 cannula, Webster, intravenous.
2 needles, Robb, 12 G.
1 forcep, Kelly, 5½″.
1 knife, No. 3 with No. 10 blade.
1 knife, No. 3 with No. 11 blade.
1 knife, No. 3 with No. 15 blade.
3 towels.
4 sponges, gauze, 4″ x 4″.
4 sponges, gauze, 2″ x 2″.

*A minor suture tray is sometimes substituted for the tray when it is so ordered. See "B" under procedure on Angiocardiography.

ANGIOCARDIOGRAPHY

Purpose: To administer a radiopaque solution into the blood stream in order to aid in the diagnostic study of the heart and the blood vessels.

METHOD

IMPORTANT POINTS

A. General Instructions

1. Consultation is requested on Standard Form 513 and sent to the Peripheral-Vascular Clinic.
2. The patient is sent, by appointment, to the Peripheral-Vascular Clinic with the clinical record and all previous X-rays.
3. A control radiogram is taken on the morning of the day the procedure is done.

B. Equipment

Minor suture tray (from C. M. S.).

2 syringes, 50 cc.
2 needles, Robb
} (from Peripheral-Vascular Clinic).

Procaine solution, 1% and 2%	Sponges, 4″ x 4″.
Benadryl solution, I. V.	Sponges, 2″ x 2″.
Heparin solution, I. V.	Ace bandage.
Adrenalin solution, 1:1000.	2 needles, 20 G, 2″.
Diodrast solution, 35%, 30 cc.	2 needles, 22 G, 2″.
Diodrast solution, 70%, 30 cc.	Sponges, alcohol.
Diodrast solution, 35%, 1 cc.	Sponges, dry sterile.
1 flask normal saline.	Adhesive tape.
1 ampoule decholin.	Tourniquet.
1 can ether.	Lubricant jelly.
1 syringe, 30 cc.	Sterile gloves.
1 syringe, 5 cc.	Stop watch.
3 syringes, 2 cc.	
1 syringe, tuberculin.	

C. Preparation of the Patient

1. The patient may have breakfast but nothing thereafter until the treatment is completed.
2. Medications are given as ordered.
3. Take the patient on a litter to the treatment room at the appointed hour.

D. Explanation of the Operative Procedure

A venotomy is done, usually on the right antecubital vein. A Robb needle is inserted and secured in the lumen of the vein.

The patient is tested for sensitivity to diodrast and the circulation time is determined by the arm-to-tongue or arm-to-lung methods.

Observe patient for flushing, urticaria, fall in blood pressure.

The patient, with needle in place, is taken to the Radiological Service where the procedure is completed.

A tray of syringes, needles, contrast medium, I. V. benadryl and adrenalin are taken to Radiological Service.

The patient is placed before the fluoroscopic screen and the contrast medium is injected rapidly through the needle.

Angiocardiography is performed by means of serial radiograms taken in rapid succession while radiopaque medium is circulating in the blood.

By means of delay circuits roentgen exposures are made at desired phases of the cardiac cycles.

The patient is returned to the treatment room where the needle is removed, the incision sutured and a sterile dressing applied.

E. Aftercare of the Patient

1. The patient is returned to ward on a litter.
2. Patient may resume normal activities unless contraindicated.

F. Care of Equipment

1. Articles used for procedure are returned to their proper place.
2. Return Robb needles and 50 cc. syringes to the Peripheral-Vascular Clinic.
3. Clean articles on minor suture tray and return to Centralized Matériel Section.

D. Aftercare of the Patient

1. The patient remains in bed until examined by the doctor.
2. Blood pressure, temperature, pulse, and respirations are recorded every half hour for 6 hours; every hour for 12 hours; and then every 4 hours until the order is discontinued.
   Notify the doctor immediately of any marked change.
3. Observe the patient for symptoms of urticaria, weakness on one side, tingling sensation in the arm and leg of the operative side, disturbance of speech. — Symptoms may appear soon or be delayed for several hours.
4. The patient may have fluids and food when tolerated.

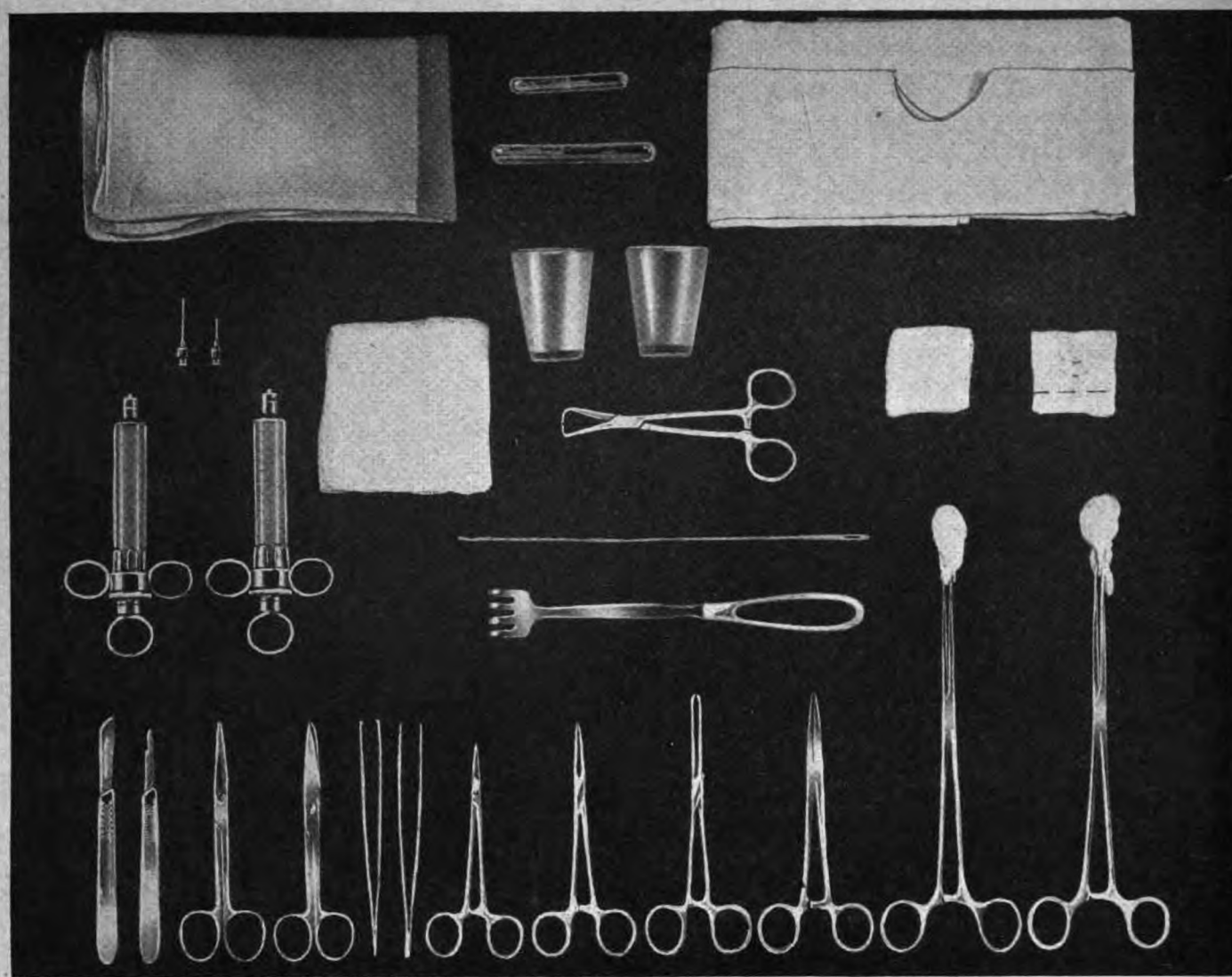
E. Care of Equipment

Articles on the arteriogram tray are cleaned, replaced on the tray and wrapped for return to the Centralized Matériel Section.

BASAL METABOLISM DETERMINATION

Purpose: To determine the rate of absorption of oxygen by the blood from the lungs under basal conditions.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. The appointment is scheduled with the Medical Service, Basal Metabolism Section.	A basal metabolism rate between −15 and +15 is considered to be within normal limits.
2. Instruct the patient as to the nature of the test in order to allay any fear or apprehension.	
3. Have Basal Metabolism, Standard Form 514i (with the exception of the room temperature and the barometric pressure), completed in duplicate for the technician before the determination is begun.	Accurate results demand complete relaxation by the patient.
B. Preparation of the Patient	
1. The patient is given a light supper the evening prior to the determination.	
2. Record the patient's weight and height at 2000 hours.	
3. The patient should be in bed by 2100 hours.	
4. Food, fluids, and smoking are withheld after 2100 hours until after the completion of the determination.	
5. Move ward patients to a private room the night before, if possible. Otherwise, screen the bed.	
6. Bathroom privileges are allowed until 2400 hours.	
7. All medications are contraindicated unless specifically ordered by the doctor.	
8. Do not disturb the patient on the morning of the determination.	
9. Measure the temperature, pulse and respirations and record on Standard Form 514i prior to the determination. Notify the Basal Metabolism Section and also the ward doctor if the patient has any elevation of temperature.	Each degree Fahrenheit of fever causes the metabolic rate to rise about 6%.



BIOPSY TRAY

1 knife, No. 4 with No. 20 blade.
1 knife, No. 3 with No. 15 blade.
1 scissors, Mayo, curved.
1 scissors, suture.
1 forceps tissue, mouse tooth.
1 forceps, tissue, smooth.
8 forceps, mosquito, straight, 5″.
4 forceps, Kelly, curved, 5½″.
4 forceps, Allis.
1 needle holder.
2 forceps, sponge, 9″ with sponge.
2 syringes, Luer-Lok, 10 cc.
1 needle, hypodermic, 22 G, 1″.
1 needle, hypodermic, 26 G, ½″.
6 sponges, gauze, 4″ x 4″.
2 retractors, rake, 4 prong.
1 probe, straight, 8″.
4 towel clips.
12 sponges, gauze, 2″ x 2″.
1 needle, suture, Keith, straight.
2 needles, suture, curved cutting edge, No. 18.
2 medicine glasses.
6 towels.
1 suture, silk, 2–0 tube.
1 suture, silk, 4–0 tube.
1 biopsy sheet.

SUPPLIED BY WARD

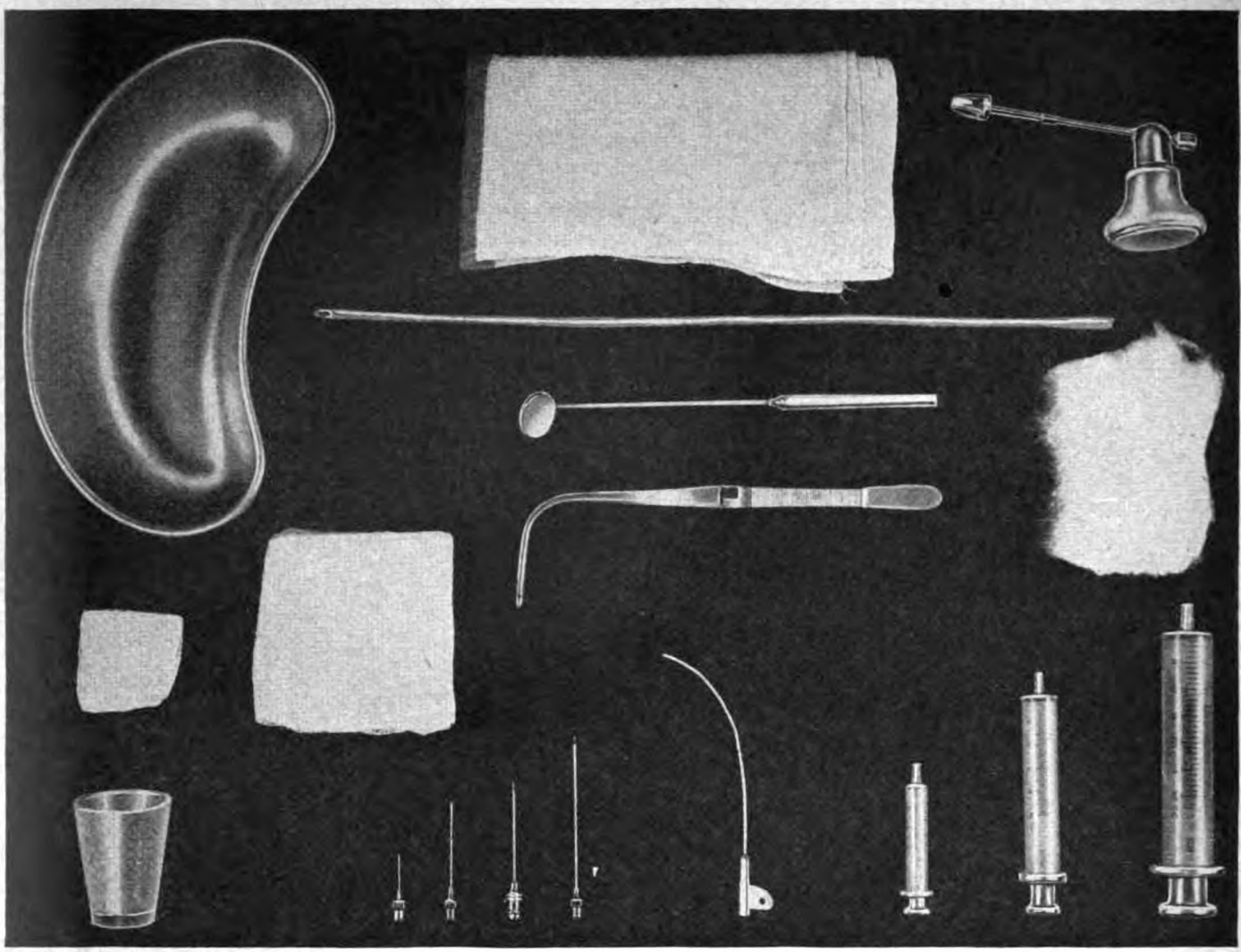
Skin preparation tray.
Safety razor and blades.
Procaine solution, 1%.
Biopsy jar, with formaldehyde, 10%.
Sterile gloves.
Sterile dressings.
Roller bandage, 2″ and 3″.

Standard Form 515, Tissue Examination, in triplicate

BIOPSY

Purpose: To remove a small piece of tissue for microscopic examination.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. The procedure may be done in the treatment room or at the bedside as the doctor directs.	
2. Permit for Operation, Standard Form 522, is completed and signed before the biopsy is done.	
B. Procedure	
1. Set up a sterile field using the tray wrapper as the cover for the table.	
2. Assist the doctor as needed throughout the procedure.	
3. Have ready a biopsy jar containing formaldehye 10% to receive the specimen.	
4. If the tissue is to be examined by frozen section place the specimen on a sterile 4″ x 4″ gauze sponge and place inside a folded sterile towel. Label the towel with the patient's name, ward, and nature of specimen. Send to the laboratory immediately.	Specimens for frozen section should never be put in a fixing solution.
5. Send all tissue specimens to the laboratory with Standard Form 515, Tissue Examination, in triplicate.	Standard Form 515 must be typewritten and contain the doctor's signature.
6. Record in nurses' notes: Biopsy, by whom done, and condition of patient.	Watch incision for bleeding.
C. Care of Equipment	
Wash all articles, place on tray and rewrap for return to Centralized Matériel Section.	



BRONCHOGRAPHY TRAY

1 medicine glass.
1 needle, hypodermic, 23 G, ¾″.
1 needle, hypodermic, 19 G, 2″.
1 needle, hypodermic, 17 G, 2″.
1 needle, hypodermic, 17 G, 3″.
1 cannula, sphenoid.
1 syringe, 2 cc.
1 syringe, 10 cc.
1 syringe, 30 cc. without adaptor.
6 sponges, gauze, 2″ x 2″.
6 sponges, gauze, 4″ x 4″.
1 forceps, laryngeal.
1 mirror, laryngeal, No. 5.
1 catheter, French, No. 14.
1 wad cotton, absorbent.
1 basin curved.
2 towels.
1 atomizer without bulb.

N. B. Thoracic Surgery Ward obtains this tray from Centralized Matériel Section.

SUPPLIED BY WARD

1 ampoule sodium amytal, 7½ gr.
2% cocaine.
5% cocaine.
Lipiodol.
Alcohol lamp.
Adhesive.
Lubricating jelly.

BRONCHOGRAPHY

Purpose: To aid in the diagnosis of lung pathology after the bronchial passages have been outlined by a radiopaque dye instilled through the trachea.

METHOD

A. General Instructions

1. A thoracic surgery consultation is requested on Standard Form 513 and sent to the Thoracic Surgery Section.
2. Thoracic surgery notifies the ward when the consultation is to be done.
3. The patient is sent to surgery with his complete clinical record and all X-ray films.
4. The Thoracic Surgery Section schedules the bronchogram with the Radiological Service and also notifies the ward of the appointment and orders for the patient.
   Bronchograms are done as scheduled. The bronchography tray is obtained from the Centralized Matériel Section and taken to the Radiological Service.
5. Female patients must be accompanied by a female technician from the individual ward.

B. Preparation of the Patient

1. A light breakfast is given on the day of the examination.
2. Nothing by mouth is permitted after 0900 hours.
3. Medications are given as ordered.
4. The patient is dressed in pajamas, robe, and slippers. Spectacles, jewelry, and false teeth are removed.
5. The patient is sent to the Radiological Service on a litter or wheelchair with his clinical record and X-ray films.

C. Aftercare of the Patient

1. Postural drainage is done for 20 minutes to help remove the lipiodol from the bronchial passages.
2. Instruct the patient not to eat or drink for 2 hours.
3. Watch the patient for a cocaine reaction. Notify the doctor if the patient shows any signs of restlessness, skin pallor and cyanosis, or if the pulse and respirations are rapid and the pupils dilated.

D. Care of the Equipment

The articles on the tray are washed and returned with the tray to the Centralized Matériel Section.

IMPORTANT POINTS

Bronchograms aid in the diagnosis of bronchiectasis and bronchogenic neoplasms.

The local anesthesia used in the throat may interfere with swallowing and cause aspiration into the lungs.

CARDIAC CATHETERIZATION

Purpose: To study the circulatory dynamics of the right side of the heart by means of a venous catheter introduced under fluoroscopic control.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. Cardiac catheterization, when indicated, is ordered by the Cardiology Section.	
2. Consultation with the Cardiology Section is requested on Consultation Sheet, Standard Form 513, in duplicate, which is sent to the Cardiology Section.	
3. All X-ray films on the patient and the clinical record are required for the cardiology consultation.	The patient's condition determines whether he is seen in the Cardiology Clinic or on the ward.
4. Permit for the cardiac catheterization is obtained on Authorization for Anesthesia, Operations, Etc., Standard Form 522.	
5. On adults the procedure is performed under local anesthesia.	
B. Preparation of the Patient	
1. Cleanse the designated arm with phisohex twice on the day prior to the procedure.	
2. The patient is given extra nourishment (sandwich and milk) at bedtime on the night prior to the procedure and nothing by mouth thereafter until the procedure is completed.	
3. Antibiotics are given as ordered on the day of the procedure.	Notify the doctor if the patient is known to be allergic to penicillin.
4. Record blood pressure, rectal temperature, pulse and respirations the morning of the procedure to be used as a base line for post catheterization comparisons.	
5. Preoperative medications are given as ordered.	Preoperative orders are not routine and vary from patient to patient.
6. Have the patient void before leaving the ward.	
7. The patient is sent to the Cardiology Laboratory on a litter at the appointed time.	
C. Explanation of the Operative Procedure	
A venotomy is done usually on the median basilic vein. The catheter is inserted and passed successively under fluoroscopic control until the pulmonary artery and the smaller pulmonary radicles are reached. Blood samples are taken through the catheter from various cardiovascular sites. The samples are analyzed for the blood oxygen content. Continuous pressure tracings are made by a pressure manometer as the catheter is withdrawn from one cardiovascular structure to another. They provide data for later diagnostic studies and interpretation. The oxygen content of the room air, of expired air, of the pulmonary artery and of arterial blood provide the data for the calculation of the cardiac output. The cardiac output per heart beat in turn provides the information for the stroke output. Cardiac catheterization provides excellent information of the dynamics of the right side of the heart. One of its most practical applications has been in the diagnosis of congenital heart disease.	
D. Aftercare of the Patient	
1. The patient remains in bed except for bathroom privileges for the remainder of the day.	Watch for symptoms of vasovagal reactions, i. e., nausea, sweating, passage of gas by rectum, coldness of the skin. The reaction is counteracted by ephedrine sulphate.
2. Rectal temperatures are taken 4 times daily for 5 days.	
3. Antibiotics are given as ordered the first morning after the procedure.	
4. If the patient complains of moderate amount of pain or edema of the hand, the elastic bandage may be reapplied more loosely, the arm elevated on a pillow and an ice cap applied.	Notify the doctor if the pain is severe or persistent.
5. The ward doctor is responsible for removing the stitches.	

CYSTOGRAPHY AND RETROGRADE UROGRAPHY

Preparation for Examination

Purpose: To visualize the bladder by means of cystoscopic examination and cystography and to obtain detailed information of the upper urinary tract through the medium of radiopaque ureteric catheters.

METHOD

A. General Instructions

1. Consultation is requested on Standard Form 513 and sent to the Genito-Urinary Section.
2. The patient is sent by appointment to the GU Clinic with complete clinical record and all X-ray films.
3. The GU Clinic notifies the ward when the examination is scheduled and gives instructions for any special preparation.

B. Preparation of the Patient for Examination Under General Anesthesia

1. A complete blood count and urinalysis are to be done within 48 hours prior to the examination.
2. Authorization for Operation, Standard Form 517, must be completed and signed prior to the examination.
3. Food and fluids are withheld after 2400 hours on the night prior to the examination.
4. A cleansing enema is given at 2100 hours on the night prior to the examination.
5. Preanesthesia orders are written by the anesthetist.
6. Send the patient to the GU Clinic on a litter at the scheduled hour.

C. Preparation of the Patient for Examination Under Local Anesthesia

1. Fluids and a light breakfast are permitted on the morning of examination.
2. Medications are given as ordered.
3. Give the patient a full glass of water every half hour for a period of 2 hours preceding the examination or until a total of 1000 cc. have been given.
4. Send the patient to the GU Clinic on a litter or wheel chair at the scheduled hour.

IMPORTANT POINTS

Cystoscopy and retrograde pyelograms are done when the findings of excretory urograms and I. V. pyelograms are insufficient for diagnosis.

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EXCRETORY UROGRAPHY AND CYSTOGRAPHY

Preparation for Examination

Purpose: To visualize the renal calyces, pelves, ureters and bladder in preliminary diagnostic studies of the kidneys and urinary tract.

METHOD

A. General Instructions

1. Consultation is requested on Standard Form 513 and sent to the Genito-Urinary Section.
2. The patient is sent by appointment to the GU Clinic with complete clinical record and all X-ray films.
3. The GU Clinic notifies the ward when the examination is scheduled and gives instructions for any special preparation.

B. Preparation of the Patient

1. Food and fluids are withheld after 2100 hours on the evening prior to the test.
2. If a cathartic is to be given, the order must be written by the ward doctor.
3. Send patient to the GU Clinic at the scheduled time. Ambulatory patients may walk.

IMPORTANT POINTS

Various organic compounds of iodine when given intravenously are excreted rapidly by the kidneys in the urine. This makes it possible to take urograms of the urine-containing parts of the urinary tract (intravenous pyelograms).

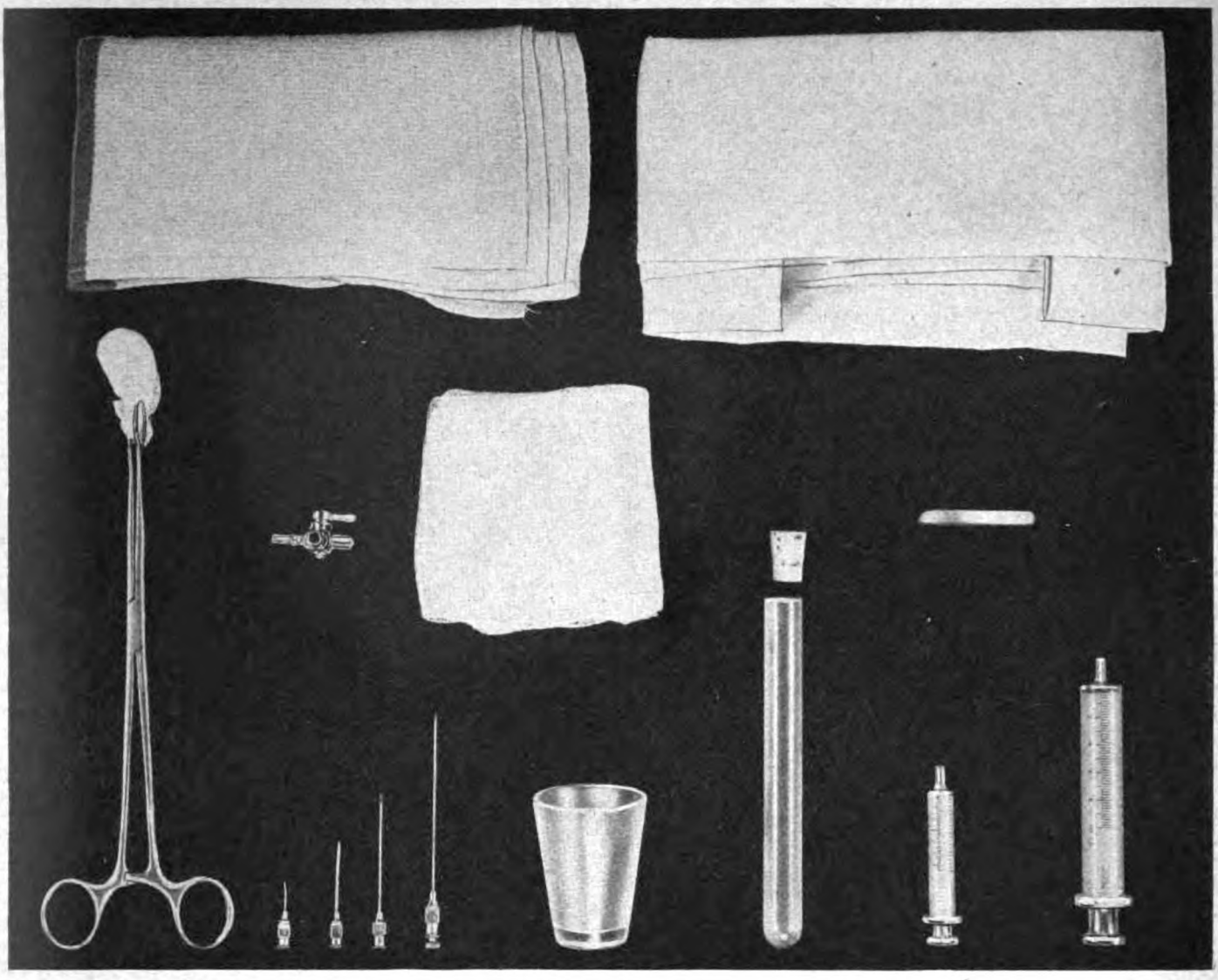
The excretion method provides a functional assessment of the excretory powers of the kidneys, ureters, and bladder.

ESOPHAGOSCOPY AND GASTROSCOPY

Preparation for Examination

Purpose: To examine the esophagus and stomach for diagnostic purposes.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. Make appointment for consultation by telephone with the Gastro-Intestinal Clinic office, Ward 37. Send Consultation, Standard Form 513, in duplicate, complete clinical record and all X-ray films with the patient to the clinic for the consultation. Procure X-ray films from the Radiological Service on the day prior to the consultation.	Gastroscopy makes it possible to view the color and condition of the stomach lining; reveals small gastric ulcers not shown on X-rays and aids in determining the type and operability of gastric tumors.
2. The clinic will notify the ward when the diagnostic procedure is scheduled.	
3. Medications listed as routine preparation for this examination should be written by the doctor for the individual patient.	
B. Preparation of the Patient	
1. Food, fluids, and smoking are withheld after 2400 hours prior to the examination.	
2. At 0630 hours give nembutal, 0.2 Gm., in 30 cc. of water as a retention enema, if ordered.	
3. At 0730 hours give atropine sulphate, 0.9 mg. (gr. 1/75), hypodermically, if ordered.	
4. Send patient on a litter at the appointed hour.	
C. Aftercare of the Patient	
Food and fluids are withheld following these examinations for at least 1 hour.	The throat is anesthetized in this procedure and there is danger of aspiration as long as the effects of the local anesthesia remain.



MYELOGRAPHY TRAY (PANTOPAQUE)

1 forceps, sponge, 9″, with sponge.
1 needle, hypodermic, 26 G, ½″.
1 needle, hypodermic, 22 G, 1″.
1 needle, hypodermic, 18 G, 2″.
1 needle, spinal, short bevel, 18 G, 3″.
1 medicine glass.
1 test tube and cork.
1 syringe, 2 cc.
1 syringe, 10 cc.
1 three-way stopcock.
4 sponges, gauze, 4″ x 4″.
1 ampoule file.
2 towels.
1 spinal sheet.

SUPPLIED BY WARD

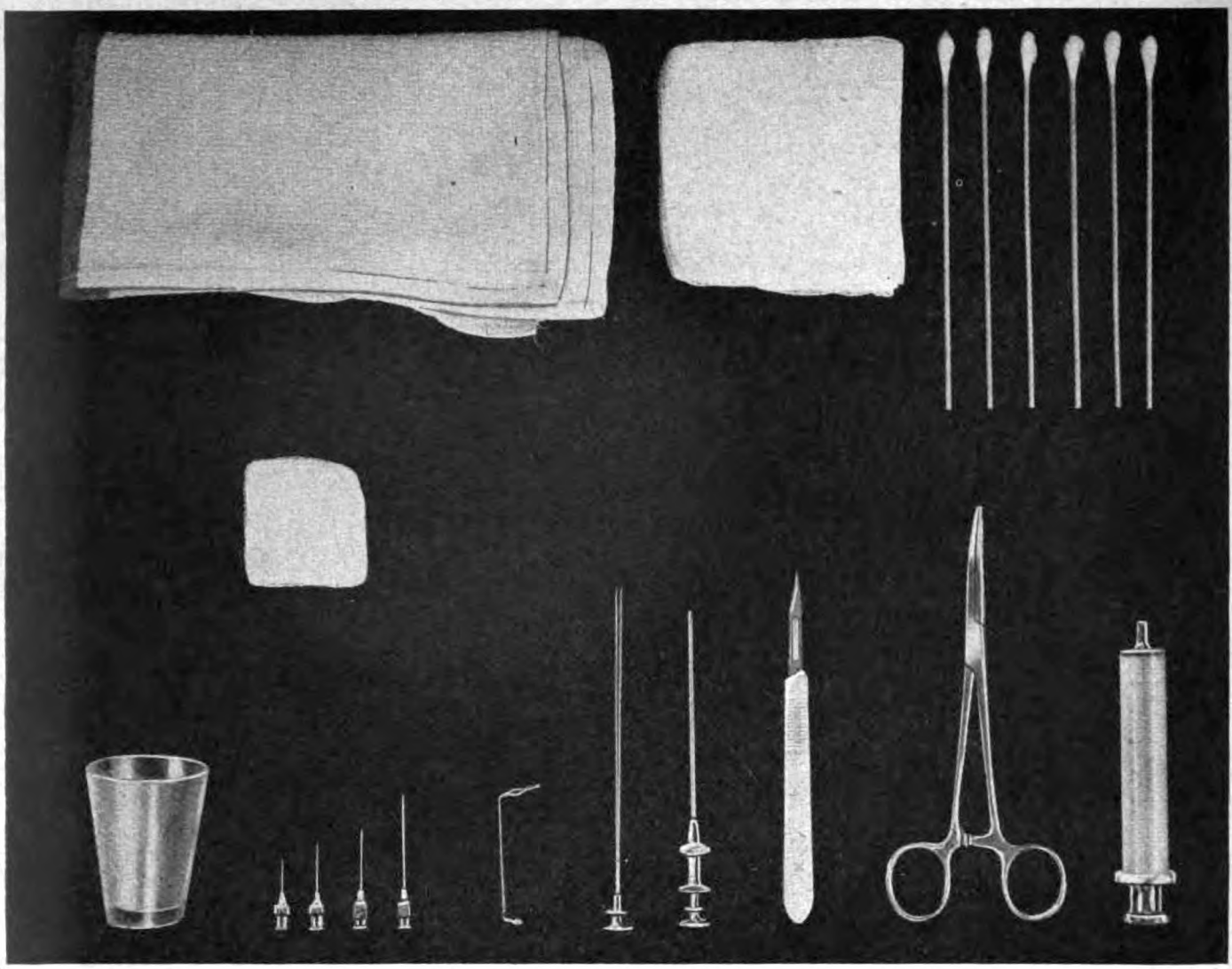
2 pairs sterile gloves.
4 ampoules, pantopaque.
Procaine solution, 1%.
Tincture merthiolate, 1:1000.

MYELOGRAPHY

(*Pantopaque Myelogram*)

Purpose: To visualize the spinal subarachnoid space or to determine the level of a suspected spinal lesion by the resulting distortion of the subarachnoid space.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. The neurosurgical consultation is requested on Standard Form 513 and sent to the Neurosurgical Section office. Ambulatory patients report by appointment to that office with their clinical records. Bed patients are examined on the ward.	Myelograms are used to demonstrate the area of pressure on the spinal cord caused by a ruptured intervertebral disc and to aid in the localization of spinal cord tumors.
2. The Neurosurgical Section schedules the myelogram with the Radiological Service. The procedure is done on day and time as scheduled.	
3. Two hours prior to the time procedure is scheduled, Standard Form 519a, Radiological Report, in duplicate, the pantopaque tray and other required supplies are sent to the Radiological Service by the Ward.	
4. Authorization for Operation, Standard Form 522, and Anesthesia, Standard Form 517, must be completed and signed before the procedure is done.	
B. Preparation of the Patient	
1. A complete blood count, including bleeding and clotting time, and urinalysis are done within 72 hours prior to the procedure.	
2. Shave the lumbar region if necessary.	
3. The patient has a liquid diet for lunch and nothing after that until the procedure is completed.	
4. Preoperative medications are given as ordered.	
5. Take the patient on a litter to the fluoroscopic room, Radiological Service, at the appointed hour.	
C. Explanation of the Operative Procedure	
The patient is placed on the table in the prone position with hands grasping the sides of the table at the level of the shoulders. The table is tilted to the desired angle. A small pillow is placed under the abdomen to flex the spine and permit easier access to the spine. The procedure is performed in the same manner as the spinal puncture. The spinal needle is inserted into the subarachnoid space and the spinal pressure is determined. Cerebrospinal fluid is then withdrawn and the pantopaque injected slowly. Fluoroscopic examinations are then made of the spinal column. Spot films are taken of defects in the outline of the column. When the radiography is completed the pantopaque is aspirated from the spinal canal. The area is wiped with alcohol and a sterile dressing is applied. The patient will be returned to the ward or the Recovery Ward as the doctor designates.	
D. Aftercare of the Patient	
1. The patient should lie flat in bed for 8 hours. The patient then resumes his usual routine.	
2. The temperature, pulse and respirations are recorded every 4 hours for 3 days.	The patient should be watched for signs and symptoms of meningeal irritation, such as headache and stiff neck.
3. Place ice cap to patient's head. Medication may be necessary to relieve headache.	
4. The patient may have fluids and food when tolerated.	
E. Care of Equipment	
1. The Ward collects the used tray and supplies from the fluoroscopic room.	
2. Articles are cleaned, replaced on tray and wrapped for return to the Centralized Matériel Section.	



LIVER NEEDLE-BIOPSY TRAY*

1 medicine glass.
1 needle, hypodermic, 26 G, ½″.
1 needle, hypodermic, 23 G, ¾″.
1 needle, hypodermic, 22 G, 1½″.
1 needle, hypodermic, 20 G, 2″.
1 needle guard.
1 needle, Silverman biopsy, 3⅜″.
1 knife, No. 3 with No. 11 blade.
1 forceps, Kelly, curved 6¼″.
1 syringe, 10 cc.
6 sponges, gauze, 2″ x 2″.
3 towels.
6 sponges, gauze, 4″ x 4″.
6 applicators.

SUPPLIED BY WARD

Skin preparation tray.
Sterile gloves.
Procaine solution 15% (without adrenalin).
Specimen jar with 10% neutral formalin.*
Glass slides.*

Standard Form 515, Tissue Examination, in duplicate

*Furnished by the Hepatic and Metabolic Section if the biopsy is done by staff of that department.

NEEDLE BIOPSY OF THE LIVER

Purpose: To obtain a specimen of liver tissue for diagnostic purposes or for evaluation of effects of liver disease.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. Prebiopsy preparation includes Blood studies 24 hours prior to biopsy. X-ray of chest within 7 days. Standardized diet for 48 hours preceding biopsy. Vitamin K, 5 mgm., parenterally daily, for 2 days prior to biopsy. Dilute soap suds or saline enema within 12 hours of biopsy if necessary.	Blood examination include: Hemoglobin. White blood count. Differential white blood count. Platelet count. Bleeding time. Clotting time. Hematocrit. Prothrombin time. Blood typing (cross matching not done routinely).
2. Authorization for Operation, Standard Form 522, and Anesthesia, Standard Form 517, are completed and signed before biopsy is done.	
3. Consultation is required if biopsy is to be done by the Hepatic and Metabolic Section. Send Standard Form 513 to Hepatic and Metabolic Section.	
B. Preparation of the Patient	
1. All food is withheld 12 hours prior to procedure. Small amounts of water may be taken.	
2. Obtain blood pressure, temperature and pulse recordings to use as a base line for post-biopsy levels.	
3. Give atropine 0.0004 Gm. on call.	
4. Place patient flat in bed with thorax and abdomen exposed, right arm above head.	
C. Procedure	
1. Doctor disinfects the skin, applies drapes and anesthetizes the area. He inserts the biopsy needle, and removes a specimen of liver tissue. Sterile dressing is applied to puncture site.	Instruct the patient how to hold his breath while the needle is being inserted.
2. Record biopsy, doctor's name and specimen to laboratory.	
D. Post-Biopsy Routine	
1. Complete bed rest is required for 24 hours.	Patient should lie on back for 6 hours after operation.
2. Take blood pressure, pulse, and respirations hourly for 8 hours and every 2 hours for next 6 hours.	
3. Take temperature every 4 hours for 24 hours.	
4. Observe patient for new or increasing symptoms or complaints. Notify doctor of increase in pulse rate, fall in blood pressure, rise in temperature, excessive pain, or hemorrhage.	The chief complication of the needle biopsy is internal hemorrhage.
5. Patient may have food, liquids, and may smoke if he desires.	Caution patient to avoid strain or exertion.
E. Care of Equipment	
1. Wash articles and replace on tray.	
2. Wrap tray for return to Centralized Matériel Section.	

PREPARATION FOR DIAGNOSTIC RADIOLOGICAL PROCEDURES

GASTRO-INTESTINAL SERIES (BARIUM MEAL)

Purpose: To study the gastro-intestinal tract by a series of radiograms obtained at successive time intervals under fluoroscopic control after the oral ingestion of an opaque emulsion.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. The appointment for the examination is made with the Radiological Service by telephone.	
2. Radiographic Reports, Standard Form 519a, in duplicate, is forwarded to the Radiological Service as soon as the appointment has been made.	
B. Preparation of the Patient	
1. No cathartics or enemas are given for 24 hours prior to the examination.	
2. A light supper is given the evening before the examination.	
3. All food and fluids are withheld after 2400 hours until the tests are completed.	
4. The patient must be dressed in a hospital gown and robe.	
5. Send the patient to the Radiological Service (Diagnostic Section), at the scheduled hour for the examination.	
C. Aftercare of the Patient	
1. The patient may not have any food or fluids until the Radiological Service has notified the ward that the tests have been completed.	
2. Instruct the patient to force fluids for 2 days following the examination.	Retention of the barium in the intestines will result in a thickened hard mass.
3. Note bowel evacuation for 2 or 3 days as necessary.	

PREPARATION FOR DIAGNOSTIC RADIOLOGICAL PROCEDURES

GALL BLADDER STUDIES

Purpose: To observe the functioning of the biliary tract by means of cholecystography.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. The appointment for the examination is made with the Radiological Service by telephone.	The normal physiological stimulus to evacuation of the gall bladder is the presence of fat in the stomach and duodenum.
2. Radiographic Reports, Standard Form 519a, in duplicate, is forwarded to the Radiological Service as soon as the appointment has been made.	
B. Preparation of the Patient	
1. On the day prior to the examination a special diet is ordered for the noon meal consisting of 1 pat of butter, 1 or 2 eggs, 1 glass of milk and cream equal parts, in addition to the usual diet.	The addition of fats to the diet is necessary to prevent physiological stasis which occurs if the patient has eaten no fats for 24 hours. When the dye is given it will not enter the gall bladder if it is already filled with concentrated bile.
2. The evening meal consists of fruit, bread or toast without butter, tea or coffee without milk or cream.	
2. Immediately after the evening meal give 1 Priodax tablet at 5-minute intervals until 6 tablets have been taken.	Priodax (phenolpropionic acid) may cause a burning sensation in the throat or upon micturition. Most patients have a mild diarrhea 5–6 hours after its ingestion.
4. All food and fluids with the exception of water are withheld after the evening meal until the examination has been completed. Smoking is permissible.	
5. The patient must be dressed in the hospital gown and robe.	
6. Send the patient to the Radiological Service (Diagnostic Section) at the scheduled hour for the appointment.	

PREPARATION FOR DIAGNOSTIC RADIOLOGICAL PROCEDURES

THE COLON (BARIUM ENEMA)

Purpose: To study the colon by means of fluoroscopy and radiology after the introduction of an opaque substance into the colon.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. The appointment for the examination is made with the Radiological Service by telephone.	The barium enema method is used for studying the motor function of the large intestines—its method of filling and its tonic and peristaltic activity.
2. Radiographic Reports, Standard Form 519a, in duplicate, is forwarded to the Radiological Service as soon as the appointment has been made.	
3. Medications listed as routine preparation for this examination should be written by the doctor for the individual patient.	
B. Preparation of the Patient	
1. At 1600 hours on the day prior to the examination give castor oil, 45 cc. If castor oil is contraindicated, compound licorice powder, 2-4 drams, may be substituted as ordered.	
2. Give a light supper consisting of tea, toast, and fruit.	
3. At 0600 hours on the morning of the examination the patient is given tap water enemas until the solution returns clear.	The colon must be completely free of feces and gases for an effective examination.
4 The breakfast is withheld but the patient may have tea, coffee or water as desired.	
5. The patient must be dressed in a hospital gown and robe.	
6. Send the patient to the Radiological Service (Diagnostic Section) at the scheduled hour for the examination.	

PROCTOSCOPY AND SIGMOIDOSCOPY

Preparation for Examination

Purpose: To examine the rectum and lower sigmoid colon by means of a sigmoidoscope.

METHOD

A. General Instructions

1. Make the appointment for examination by telephone with the Proctology Section of either the Surgical or Medical Service as indicated by the doctor.
2. Send Consultation, Standard Form 513, in duplicate, complete clinical record and all X-ray films with the patient to the Proctology Section at the scheduled hour.
3. A nurse or female technician accompanies female patients and assists the doctor with the examination.

B. Preparation of the Patient

1. Patients scheduled with the Medical Proctology Section are prepared as ordered.
2. Patients scheduled with the Surgical Proctology Section receive a light supper on the night prior to and a liquid diet on the morning of the examination. Cleansing enemas are given the night before and the morning of the examination until the return flow is clear.
3. Send the patient to the designated section at the appointed hour. Ambulatory patients may walk.

IMPORTANT POINTS

Diagnosis of ulcers, carcinoma and hemorrhoids are aided by the inspection of the internal surface of the rectum and sigmoid colon.

PNEUMOENCEPHALOGRAPHY

Purpose: To visualize the intracranial space and ventricular system or to aid in the localization of an intracranial lesion.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. The neurosurgical consultation is requested on Standard Form 513 and sent to the Neurosurgical Section office. Ambulatory patients report by appointment to that office with their complete clinical records. Bed patients are examined on the ward.	In this examination the injection of air is done by the spinal subarachnoid route.
2. The Neurosurgical Section schedules the penumoencephalogram with the Radiological Service.	
3. Authorization for Operation, Standard Form 522, and Anesthesia, Standard Form 517, must be completed and signed before the procedure is done.	
4. The ward obtains the spinal puncture tray from C. M. S. The tray, necessary supplies and the X-ray request, Standard Form 519a, in duplicate, are taken to the Radiological Service on the morning of the operation.	
B. Preparation of the Patient	
1. A complete blood count, including bleeding and clotting time, is done within 72 hours of the procedure.	
2. Shave the lumbar region if necessary.	
3. Fluids and food are withheld after 2400 hours.	Reassure the patient and allay his apprehension regarding the procedure.
4. Preoperative medications are given as ordered.	
5. Take the patient on a litter to the Radiological Service (head and extremity room) at the appointed hour.	
C. Explanation of the Operative Procedure	
The procedure is done in the same manner as the spinal puncture. The patient is postured in the lateral recumbent position with the knees flexed and the head bent forward and downward. The skin is prepared and the needle inserted. After the spinal needle is in the subarachnoid space and before the removal of any fluid, the spinal pressure is determined.	
The patient is then assisted to the sitting position with the needle still in place. Cerebrospinal fluid is withdrawn and a measured amount of air is injected. When the air replacement is completed the patient is placed in the dorsal recumbent position and radiograms are taken immediately to note ventricular filling.	Stimulants should be on hand for emergency use.
If this is adequate, a series of stereoscopic films of each side of the skull are taken.	
The patient is usually removed to ward unless his condition requires that he be transferred to the Recovery Ward.	

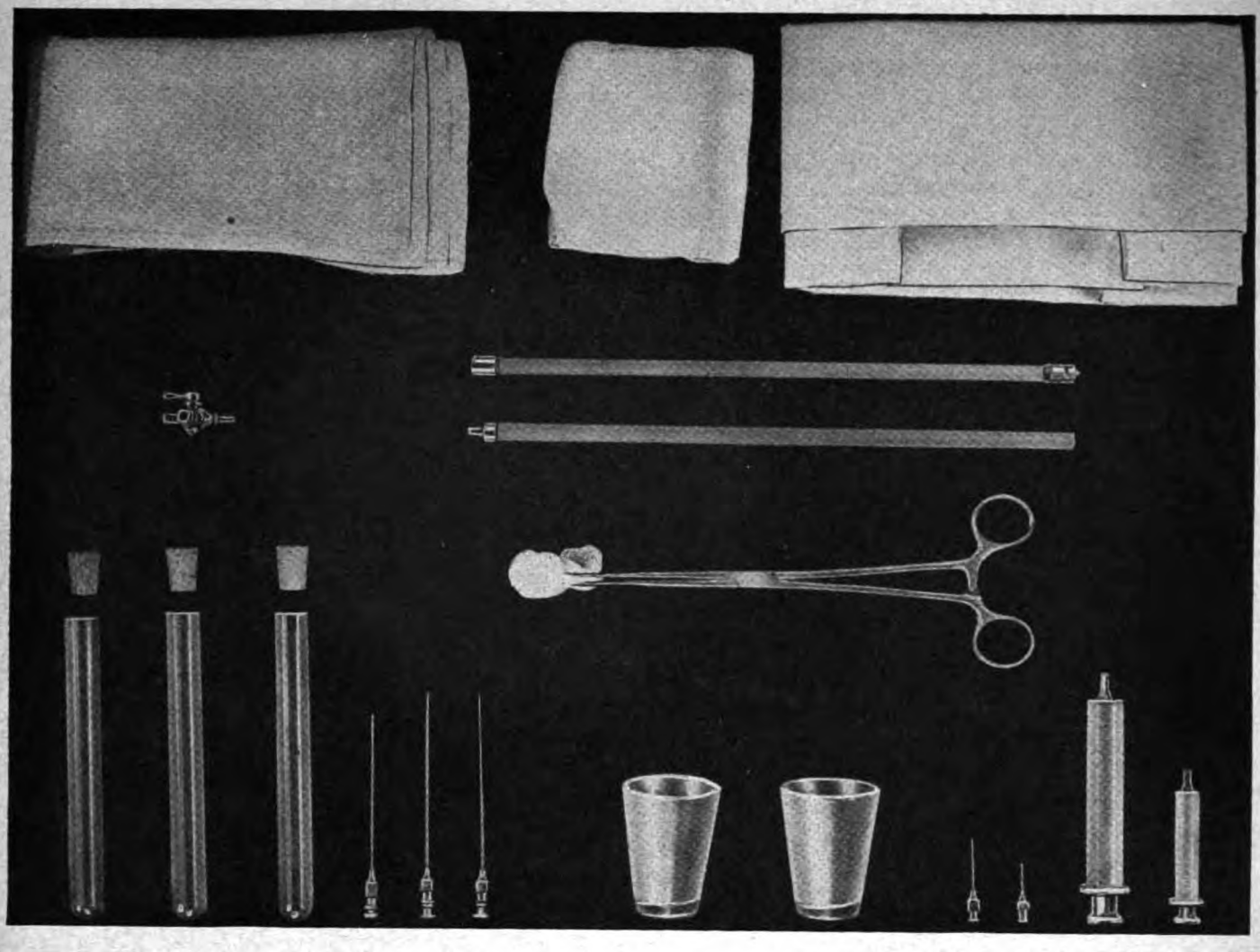
D. Aftercare of the Patient

1. The patient lies flat in bed for 12 hours.
2. Blood pressure, pulse, and respirations are recorded every half hour for 6 hours, then every 4 hours until stabilized.
3. Ice cap is placed on the patient's head. Medications may be necessary to relieve headache.
4. Observe the patient closely for signs of increased intracranial pressure.
5. Patient may have food and fluid as tolerated.

E. Care of Equipment

1. The ward collects the used tray and supplies from the Radiological Service.
2. Wash the articles and rewrap the tray for return to Centralized Matériel Section.

Nursing care should be directed toward making the patient as comfortable as possible. Headaches may persist until the air is absorbed.



SPINAL PUNCTURE TRAY

3 test tubes with corks.
1 needle, spinal puncture, 18 G, 3½″.
1 needle, spinal puncture, 20 G, 3½″.
1 needle, spinal puncture, 22 G, 3½″.
2 medicine glasses.
1 needle, hypodermic, 22 G, 1″.
1 needle, hypodermic, 26 G, ½″.
1 syringe, 10 cc.
1 syringe, 2 cc.
1 forceps, sponge, 9″, with sponge.
1 three-way stopcock.
1 spinal manometer.
2 towels.
4 sponges, gauze, 4″ x 4″.
1 spinal sheet.

SUPPLIED BY WARD

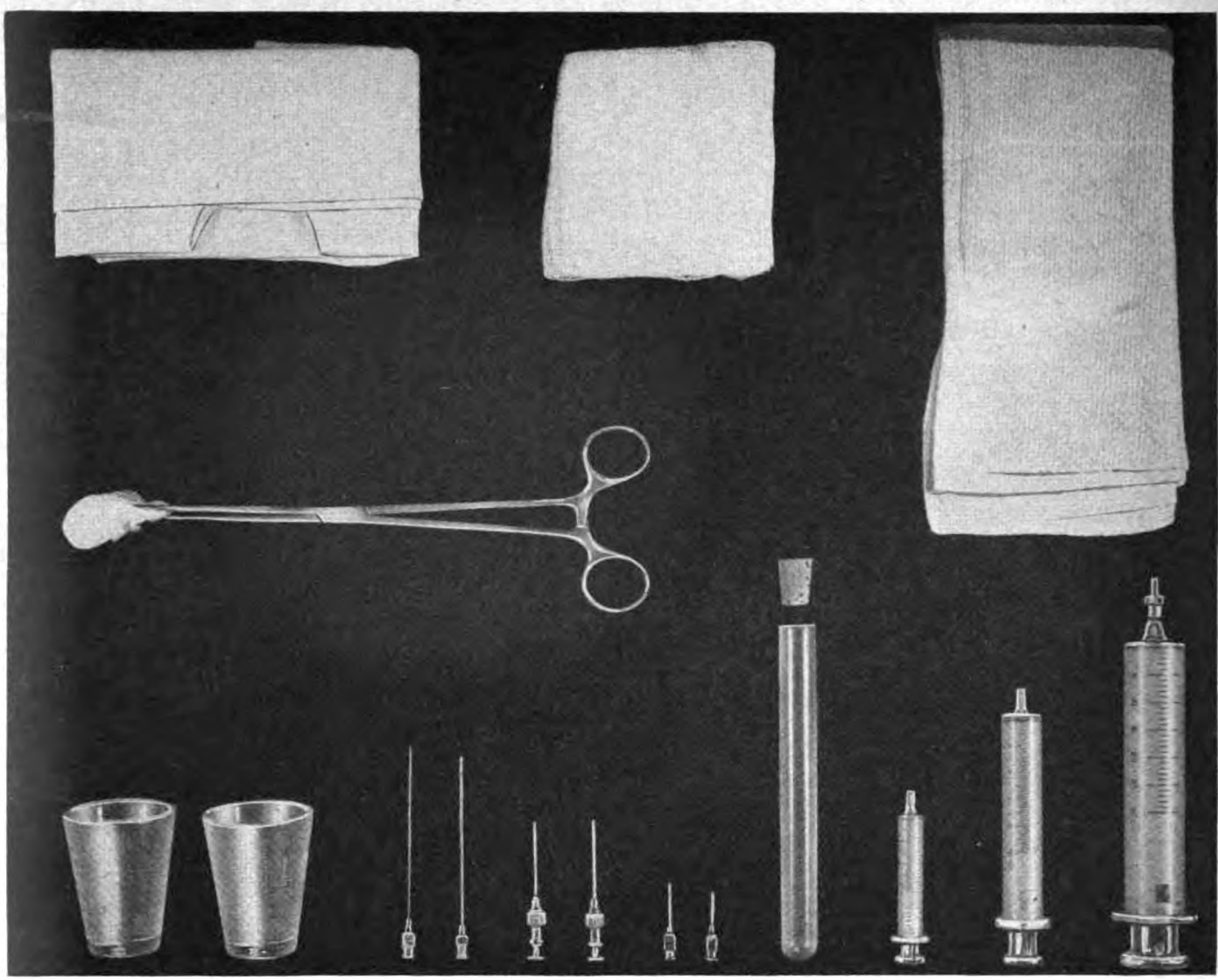
Skin preparation tray.
Razor and blades.
Sterile gloves.
Procaine solution, 1 %.
Medication as ordered.
Labels, small gummed.

Standard Form 514h, Spinal Fluid, in duplicate

SPINAL PUNCTURE

Purpose: To withdraw spinal fluid for diagnostic purposes, to determine spinal fluid pressure, or to administer medications intrathecally.

METHOD	IMPORTANT POINTS
A. Preparation of the Patient	
1. Place in position as directed by doctor. The patient is usually in the lateral recumbent position with knees drawn up to chin, head bent forward and down.	Have an assistant hold the patient in position if he is restless.
2. Expose lumbar region, shave area if necessary.	
B. Procedure	
1. Assist doctor with skin preparation and sterile drapes.	
2. The doctor anesthetizes the area and inserts the spinal needle into the subarachnoid space. When fluid is obtained, he removes the stylet; attaches the three-way stopcock and manometer to the needles and determine the spinal fluid pressure.	Watch for change in pulse, faintness, or other unusual symptoms.
a. The doctor may wish to do the Queckenstedt test. The nurse will apply firm pressure over the jugular veins and release pressure as directed while the doctor notes the rise and fall of the spinal fluid pressure on the manometer.	
b. Readings are recorded for each side.	
3. If specimens are to be collected, the doctor removes the manometer, opens the stopcock, and holds a test tube under the needle to collect the fluid. One or more specimens may be collected.	
4. Mark the test tubes in the order in which the specimens are collected, e. g., 1, 2, 3.	
5. If a medication is to be injected, the nurse will prepare the syringe as directed by the doctor.	
6. Apply collodion or sterile dressing when the needle is removed.	Instruct patient as to restriction of activity, if any.
7. Record in nurses' notes: Procedure, by whom done, amount and character of fluid withdrawn, patient's reaction, amount and kind of medication injected, if any, and type of examination requested.	
8. Fill in Standard Form 514h with the requested examinations. An additional 514h form is required if the colloidal gold test is ordered. Take all specimens to the laboratory immediately.	
C. Care of Equipment	
1. Wash articles, replace on tray. Wrap manometer separately.	
2. Rewrap tray for return to Centralized Matériel Section.	



STERNAL BONE MARROW ASPIRATION TRAY

2 medicine glasses.
1 needle, hypodermic, 22 G, 3″.
1 needle, hypodermic, 17 G, 3″.
2 needles, Osgood, 16 G.
1 needle, hypodermic, 23 G, ¾.
1 needle, hypodermic, 25 G, ½″.
1 test tube and cork.
1 syringe, 2 cc.
1 syringe, 10 cc.
1 syringe, 30 cc.
1 forceps, sponge, 9″, with sponge.
1 biopsy sheet.
4 sponges, gauze, 4″ x 4″.
3 towels.

SUPPLIED BY WARD

Skin preparation tray.
Razor and blades.
Sterile gloves.
Procaine solution, 1 %.

Standard Form 515, Tissue Examination, in duplicate

STERNAL BONE MARROW ASPIRATION

Purpose: To remove a specimen of bone marrow for diagnostic blood studies or to evaluate therapeutic response in certain diseases of the blood.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. Consultation Sheet, Standard Form 513, in duplicate, is sent to the laboratory (Hematology Section) when the procedure is ordered.	
2. A member of the staff of the Hematology Section may perform the aspiration. The doctor will bring special glass slides and biopsy jar when he comes to the ward.	
3. Standard Form 522, Authorization for Operation, should be completed and signed before the biopsy is done.	
4. The procedure is usually done in the treatment room of the ward unless ordered otherwise.	
B. Procedure	
1. Open the aspiration tray on a small table using the wrapper as a table cover. Arrange a sterile working area for the doctor.	Use aseptic technique throughout the procedure.
2. Place the patient in the dorsal position on the treatment table. Insert a pillow under the shoulders so that the chest is elevated.	
3. Inspect the patient's chest and shave the area over the sternum if necessary.	
4. The procedure is done by the doctor who disinfects the skin, anesthetizes the area, and applies the sterile drapes. He inserts the aspiration needle, attaches the 30 cc. syringe and aspirates a small amount of bone marrow. A sample of bone marrow is spread on glass slides for microscopic examination; a second specimen is placed in the biopsy jar.	
5. Apply a small dressing to the area over the puncture.	Observe for bleeding at site of puncture.
6. Label the biopsy jar and slides with the patient's name, ward, and type of specimen. Fill in Standard Form 515, Tissue Examination, in duplicate. The doctor takes the specimen to the laboratory.	
7. Record in nurses' notes: Time, sternal puncture, the doctor's name, and the patient's reaction.	
8. Notify the doctor who performed the procedure and also the ward doctor if the patient has a reaction.	
C. Care of Equipment	
1. Wash all articles and replace on tray.	
2. Rewrap tray for return to Centralized Matériel Section.	

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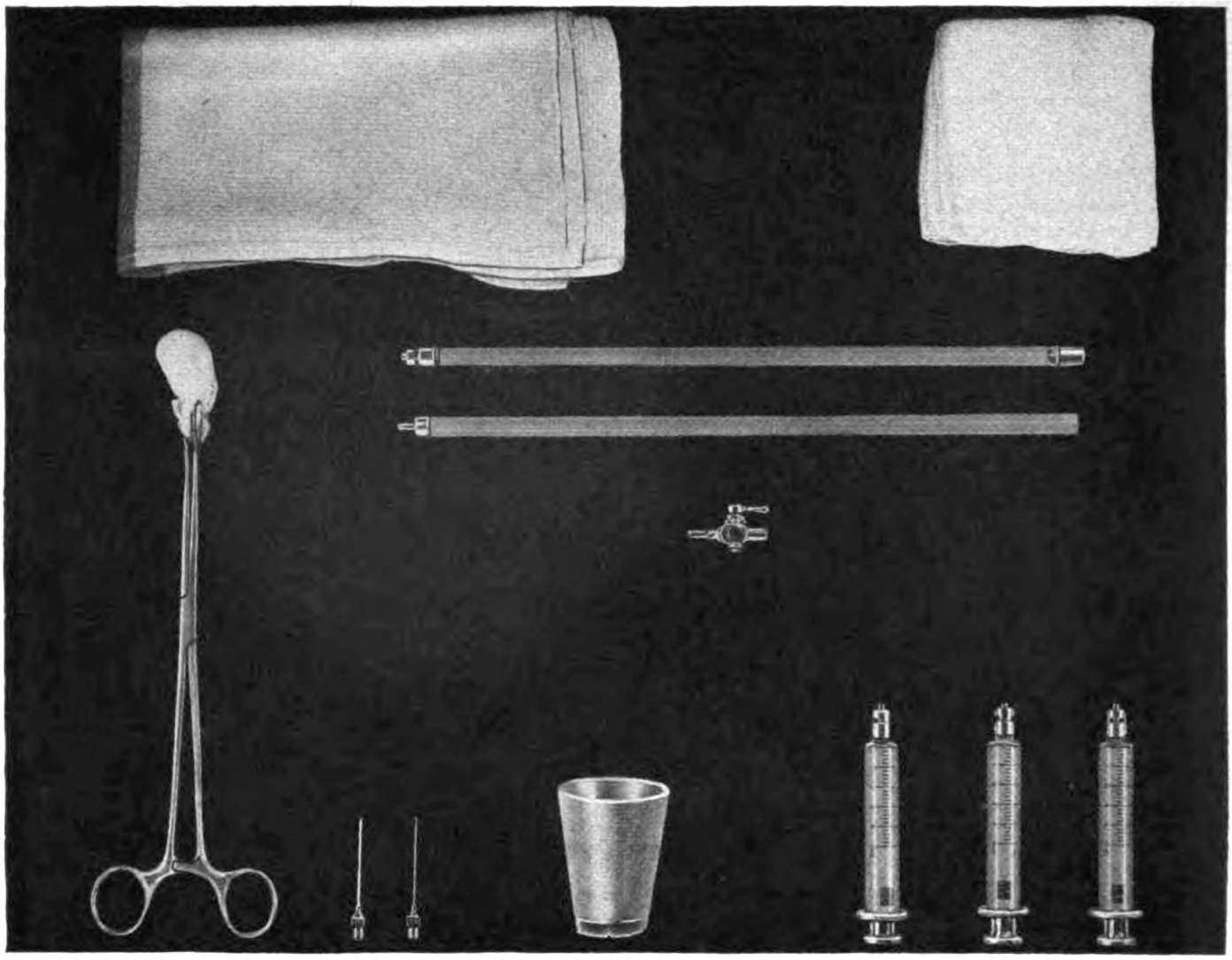


VENOUS PRESSURE TRAY

1 forceps, sponge, 9″, with sponge.
2 needles, hypodermic, 20 G, 2″.
1 medicine glass.
3 syringes, Luer-Lok, 5 cc.
1 three-way stopcock, right hand.
1 spinal manometer.
3 towels.
4 sponges, gauze, 4″ x 4″.

SUPPLIED BY WARD

Skin preparation tray.
Procaine solution, 1%.
Sterile gloves.
Stop watch.
Sterile normal saline.
Drugs: Decholin, others as ordered.

VENOUS PRESSURE

(*Direct Method*)

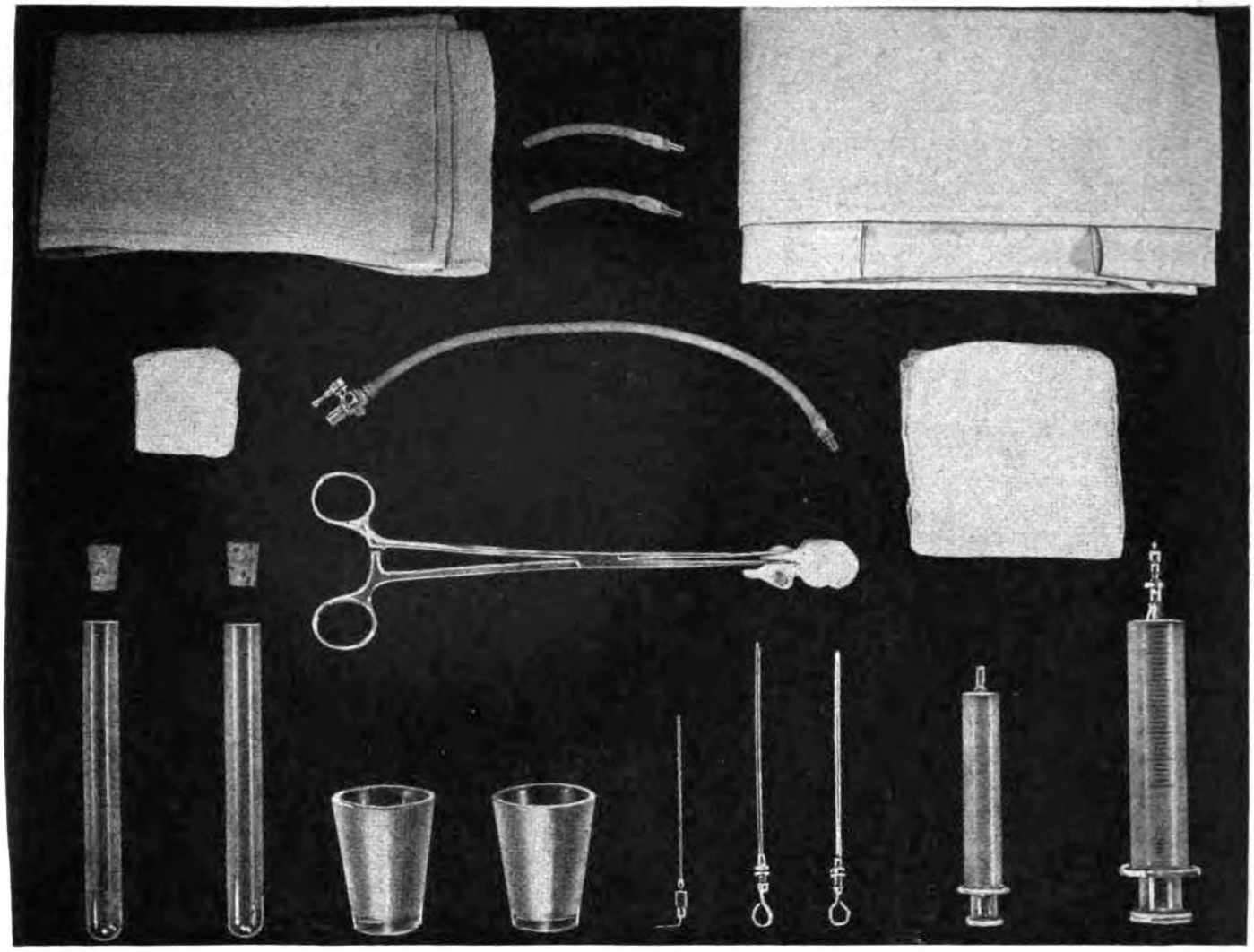
Purpose: To measure the pressure in the peripheral veins as an aid in diagnosis of certain cardiovascular conditions.

METHOD	IMPORTANT POINTS
A. Procedure for Determination of Venous Pressure	
1. Support right forearm on a pillow to the level of the heart and prepare as for any intravenous injection.	Patient should rest 15 minutes before test.
2. The procedure is done by the doctor. The antecubital fossa is prepared and the sterile drapes applied. A needle and three-way stopcock are connected to a 5 cc. syringe containing normal saline. The doctor inserts the needle into the vein and draws a small amount of blood into the syringe. The manometer is attached to the stopcock which has been adjusted so that the blood-saline runs into the manometer. The stopcock is then adjusted so that the manometer and needle are put in continuity and the blood mixture flows into the vein.	
3. The venous pressure is determined by reading on the manometer the level at which the fluid rests in the manometer tube.	
If the circulation time is to be determined following the venous pressure estimation, the needle is left in place in the vein.	

CIRCULATION TIME

Purpose: To determine the rate of or any abnormalities in rate of blood flow.

A. Determination of Circulation Time (Arm-to-Tongue)	
1. The position and preparation of the patient is the same as for the venous pressure estimation.	
2. The procedure is done by the doctor who injects drug (usually dechołin) into the vein, determines by means of a stopwatch, the elapse of time between the injection of the drug and the recognition of the bitter taste by the patient. The nurse times the procedure, if requested.	Explain the timing procedure to the patient.
3. The time of transit of the drug from the arm vein to the tongue is recorded as arm-to-tongue circulation time.	
B. Determination of Circulation Time (Arm-to-Lung)	
The procedure is sometimes done with other drugs to determine arm-to-lung circulation time. The drug is injected and the time of transit determined from the moment the drug is introduced into the vein until the patient is able to smell the drug.	If ether is ordered, the syringe should be prepared away from the patient's unit.
C. Care of Equipment	
1. Wash articles and replace on tray. Wrap manometer separately.	
2. Rewrap tray for return to Centralized Matériel Section.	



VENTRICULOGRAPHY TRAY

2 test tubes with corks.
2 medicine glasses.
1 needle, 15 G, special prepared.
2 cannulae, grazier, ventriculogram.
1 syringe, 10 cc.
1 syringe, 30 cc, with hub of needle, 18 G.
10 sponges, gauze, 2″ x 2″.
1 forceps, sponge 9″, with sponge.
1 latex tubing, I. V., 6″ with three-way stopcock and metal adaptor.
10 sponges, gauze, 4″ x 4″.
3 towels.
2 latex tubing, 1″, with metal adaptor.
1 spinal sheet.

VENTRICULOGRAPHY

Purpose: To determine the location of intracranial lesions or to determine the patency of the ventricular system.

METHOD	IMPORTANT POINTS
A. General Instructions	
The neurosurgical consultation is requested on Standard Form 513 and sent to the Neurosurgical Section office. Ambulatory patients report by appointment to that office with their complete clinical records. Bed patients are examined on the ward.	In this examination air is injected directly into the ventricles. It is used when a pneumoencephalogram is contraindicated or when clinical evidence of increased intracranial pressure is present.
2. The Neurosurgical Section schedules the examination with the Operating Room and X-ray Room.	
3. Authorization for Operation, Standard Form 522, and Anesthesia, Standard Form 517, must be completed and signed before the procedure is done.	
4. The Operating Room obtains the ventriculography tray (from C. M. S.) and furnishes other required supplies.	
B. Preparation of the Patient	
1. A complete blood count, including bleeding and clotting time, and urinalysis are done within 72 hours prior to the operation. If a craniotomy is anticipated, two blood transfusion requests, Standard Form 518, in duplicate, are forwarded to the laboratory.	
2. All food and fluids are withheld after 2400 hours.	
3. Preoperative medications are given as ordered. Definite instructions should be obtained from the doctor before shaving the patient's head. Routine preoperative care is given.	The patient's hair is saved. Place in a paper bag and mark with his name and ward number,
4. Take the patient on a litter to the X-ray Room promptly at the appointed hour.	
C. Explanation of the Operative Procedure	
The head is prepared and draped with sterile towels. Small scalp incisions and trephine holes are made in the skull, exposing the dura. The dura is opened and a blunt ventricular needle is inserted into the lateral ventricle. The procedure is repeated on the opposite side if indicated. A measured amount of cerebrospinal fluid is withdrawn and replaced by a measured amount of air. Radiograms of the skull are made immediately following the injection of air. When the radiography is completed, the galea and skin are sutured.	
The patient is transferred to the Recovery Ward unless a craniotomy is indicated and he is removed to the operating room.	

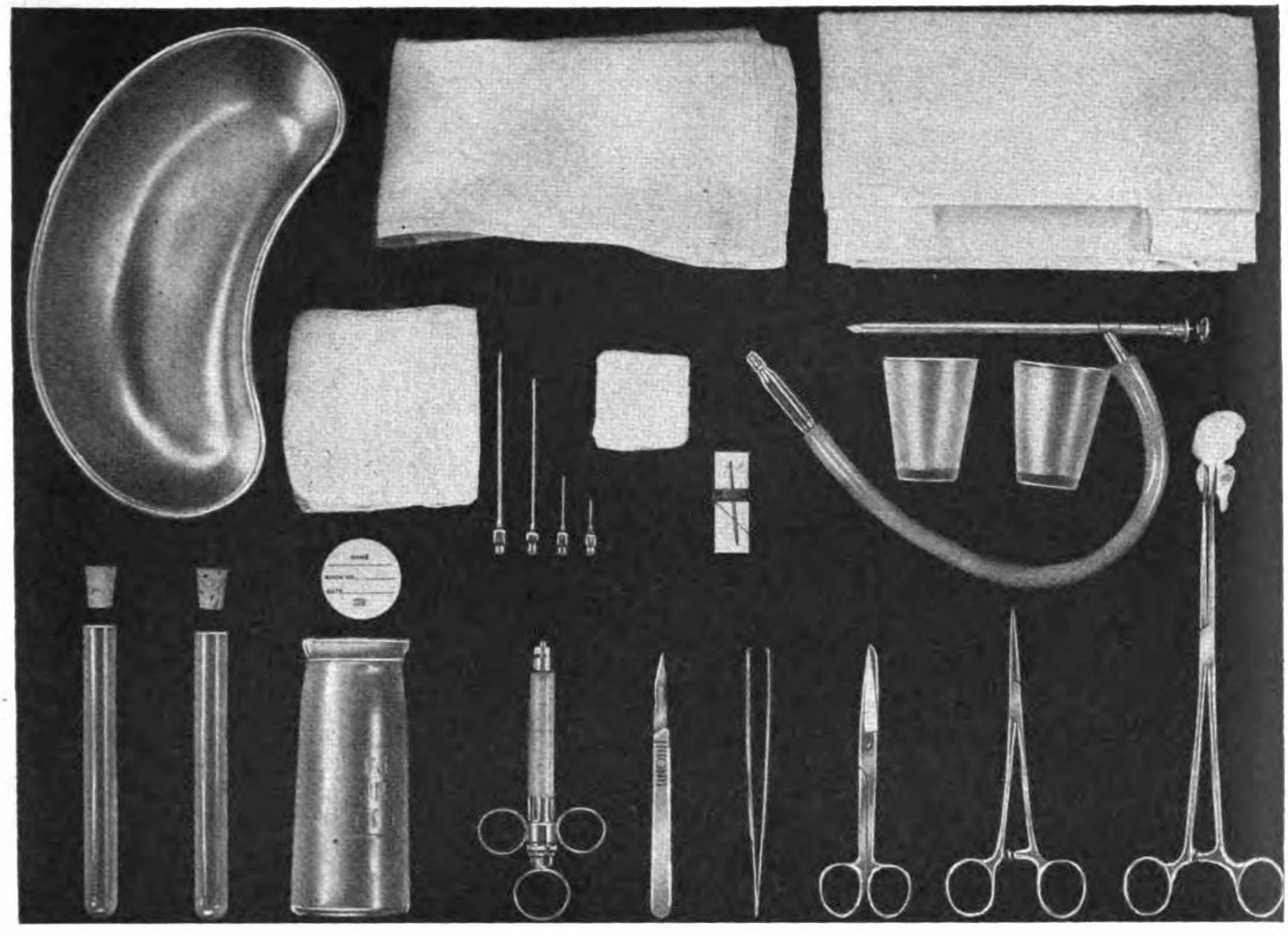
D. Aftercare of the Patient

1. The patient lies flat in bed until ordered otherwise.
2. The blood pressure, rectal temperature, pulse and respirations are recorded every half hour until stabilized; then every hour until the order is discontinued. Notify the doctor of any marked changes. Severe headache or pressure around the operative region should be reported immediately.
3. Place ice cap to patient's head. Medication may be necessary to relieve headache.
4. If oral intake is not adequate the doctor will prescribe intravenous fluids.
5. The patient may have a liquid diet when tolerated, gradually increasing to his standard diet.

E. Care of Equipment

Articles are cleaned, replaced on the tray and wrapped for return to the Centralized Matériel Section.

A suction machine, oxygen equipment and ventriculography tray are kept at the bedside for emergency use. The patient should be observed for signs and symptoms of increasing intracranial pressure, hemorrhage or respiratory collapse.



ABDOMINAL PARACENTESIS TRAY

2 test tubes with corks.
1 specimen bottle and cap.
1 syringe, Luer-Lok, 3 cc.
1 knife, No. 3 with No. 11 blade.
1 forceps, tissue, mouse tooth.
1 scissors, suture.
1 forceps, straight, 5½″.
1 forceps, sponge, 9″, with sponge.
6 sponges, gauze, 4″ x 4″.
1 needle, hypodermic, 15 G, 3″.
1 needle, hypodermic, 17 G, 3″.
1 needle, hypodermic, 22 G, 1½″.
1 needle, hypodermic, 26 G, ½″.
2 sponges, gauze, 2″ x 2″.
1 black silk 2–0 with Keith needle.
2 medicine glasses.
1 Trocar, gall bladder with 8″ rubber tubing and glass connector.
1 basin, curved.
4 towels.
1 biopsy sheet.

SUPPLIED BY WARD

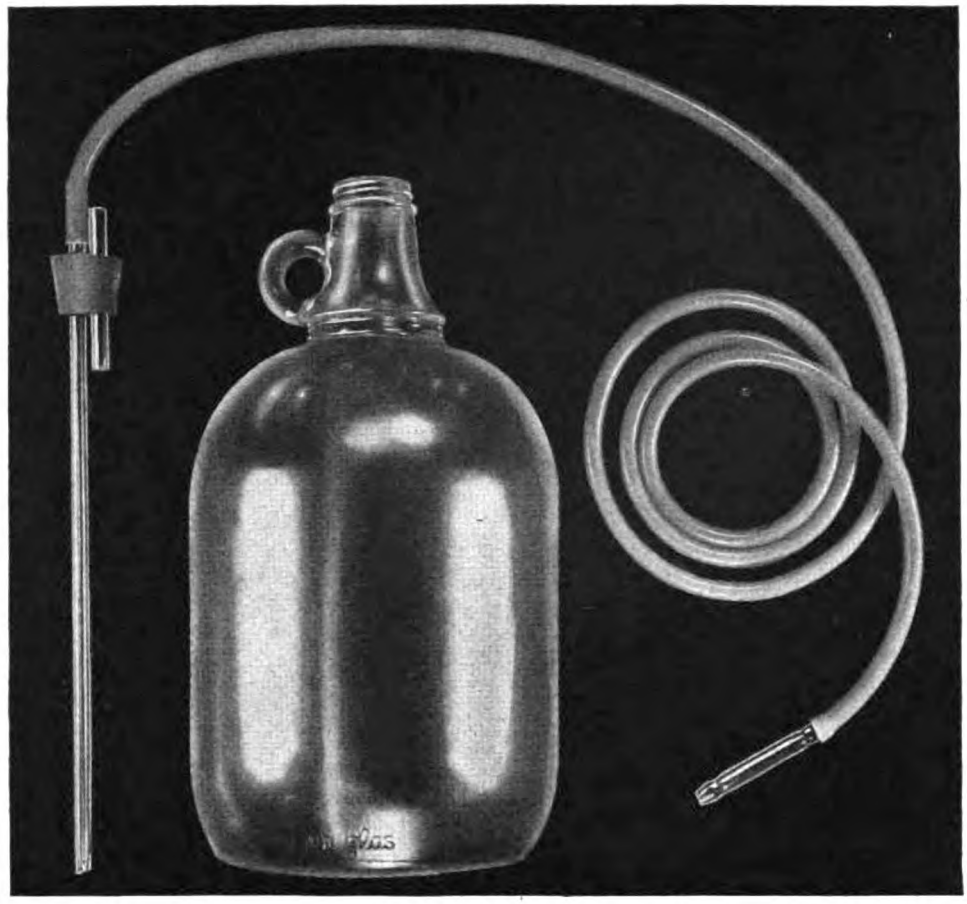
Skin preparation tray.
Safety razor and blades.
Procaine solution 1%.
Sterile gloves.
Scultetus binder.
Abdominal pad.
Pail or large bottle.

Standard Form 514m, Miscellaneous Test, in duplicate

ABDOMINAL PARACENTESIS

Purpose: To withdraw fluid from the peritoneal cavity for diagnostic or therapeutic purposes.

METHOD	IMPORTANT POINTS
A. Preparation of the Patient	
1. Shave lower abdomen if necessary.	
2. Patient must void immediately prior to treatment. (Obtain an order to catheterize if patient does not void.)	Bladder must be emptied to eliminate danger of puncturing the bladder.
3. Dress patient in pajama trousers, bathrobe, and slippers.	
4. Place the patient in a chair or, if a bed patient, have him sit on the edge of the bed with his feet on a chair or foot stool.	
5. Expose the abdomen and place a rubber sheet and towel over the patient's knees close to abdomen.	
B. Administration of Treatment	
1. Assist the doctor with the skin preparation and sterile drapes.	
2. The order in which the doctor proceeds is: Anesthetizes the area, makes a small incision through skin, introduces the trocar and cannula, withdraws the trocar allowing fluid to escape.	
3. A piece of rubber tubing is generally attached to the cannula to direct the flow of fluid into the basin or pail.	Watch patient's pulse, and color. Sudden relief of intra-abdominal pressure may cause circulatory or respiratory collapse.
4. If specimen is to be collected allow fluid to run directly into test tube.	
5. Apply a sterile dressing to incision and cover with an abdominal pad and scultetus binder.	
6. Record in nurses' notes: Procedure, by whom done, amount and description of fluid, patient's reaction, and specimen sent to the laboratory.	
C. Care of Equipment	
1. Wash articles and replace on tray.	
2. Rewrap tray for return to Centralized Matériel Section.	



Chest Drainage Set

CLOSED CHEST DRAINAGE

Purpose: To withdraw pus from the pleural cavity by means of an airtight drainage apparatus which is used in minor thoracotomy in the treatment of pneumothorax, hemothorax, pleural effusions and in combinations of the above.

A. General Instructions

1. The patient is taken to the operating room for insertion of the drainage tube and connection of the drainage apparatus.
2. The doctor assumes responsibility for the functioning of the apparatus.
3. In an emergency, clamp off the tube leading from the chest to prevent air from entering the pleural cavity. Entrance of air into the drainage apparatus will cause the lung to collapse.

B. Care of the Drainage Apparatus

1. When the patient is returned from the operating room the drainage bottle is placed on the floor and the clamps are released by the doctor. Never raise the drainage bottle above the level of the bed.
2. Check the apparatus frequently for leakage of air or obstruction in the tube.
3. Observe the patient for and report promptly to the doctor any dyspnea, cyanosis, rapid, irregular and labored respirations, tachycardia, increased blood pressure and perspiration.
4. The doctor changes the drainage bottle. The chest tube is clamped tightly before the drainage apparatus is disconnected. The drainage bottle is then removed and exchanged with a sterile bottle containing sterile water sufficient to cover the end of the long glass tube in the stopper. When the drainage bottle is connected, the chest clamp is released.
5. Measure and record the drainage *only* when the bottle is changed.

FEVER THERAPY

Purpose: To produce a predetermined increase in body temperature for therapeutic purposes by means of a fever therapy cabinet.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. The request for fever therapy is received through the Chief of the Service responsible for the patient's care.	The advantages of fever therapy over other methods of general thermo-therapy is that the regimen of fever may be completely controlled.
2. Make the appointment for consultation with the Physical Medicine Service by telephone.	
3. Send Consultation, Standard Form 513, in duplicate, complete clinical records and all X-ray films with the patient to the Physical Medicine Service for the consultation.	
4. The Physical Medicine Service notifies the ward when the fever therapy is to be given.	
5. A physical examination including and EKG and cardiac evaluation must be completed prior to the therapy.	Cardiac disease, hypertension, kidney dysfunction, respiratory infections, debility and old age are contraindications to fever therapy.
6. During the intervals between treatments, activity should be restricted and the diet should be high in caloric value and fluid intake.	
B. Preparation of the Patient	
On the day prior to fever therapy:	
1. Withold antipyretic drugs after 0100 hours for 24 hours.	
2. Measure and record rectal temperature, pulse, and respirations every 8 hours.	
3. Measure and record fluid intake and output.	
4. Send the first morning specimen of urine to the laboratory for albumin and microscopic examinations.	
5. Delay the breakfast until a blood specimen has been taken.	
6. A fasting blood specimen, to be examined for specific gravity of the blood plasma is withdrawn.,	The specific gravity of the blood determines the amount of hydration needed during the treatment.
7. A high vitamin, high caloric diet with interval nourishments is given.	
8. Two enteric-coated sodium chloride tablets (gr. vii of sodium chloride with gr. iii of dextrose per tablet) are given after each meal.	Adjustment of water and saline balance is an important factor in fever therapy.
9. At 1600 hours, measure and record the blood pressure.	
10. Give the patient a tap water enema and a bath in the evening.	
On the day of fever therapy:	
1. At 1600 hours, measure and record rectal temperature, the pulse, respirations, blood pressure, and weight.	
2. At 0700 hours, specimens are collected for a urinalysis and a complete blood count.	Previous arrangements are made with the laboratory for the blood count to be done at this hour.
3. Measure and recored the fluid intake and output.	
4. A liquid diet is given for breakfast.	
5. Morning care is given.	
6. At 0745 hours send the patient to the Physical Therapy Clinic.	

C. Care After Fever Therapy

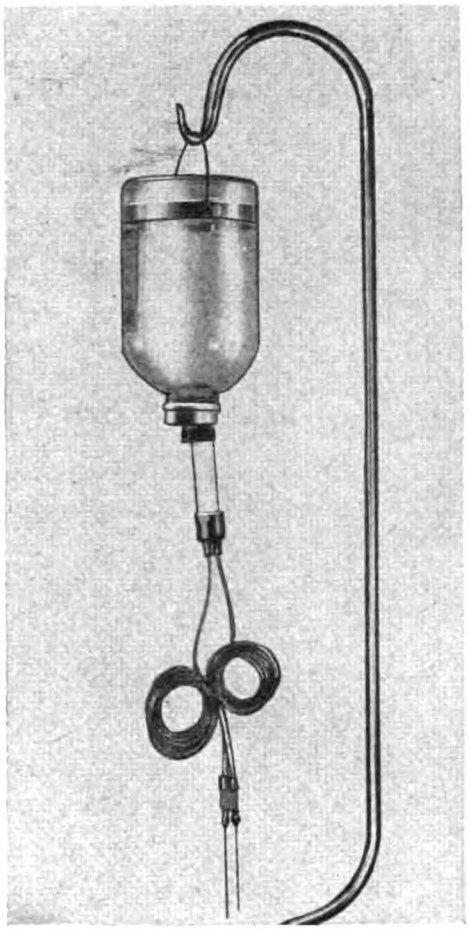
1. Measure rectal temperature, pulse and respirations every hour until the temperature returns to 100° F., then every 4 hours until normal. Report a secondary rise or a very slow fall in temperature to the doctor.

   All physical effort on the part of the patient must be prevented to avoid unnecessary cardiac strain.

2. Measure the blood pressure every hour until it is stabilized (compare with that taken prior to the treatment). Then, measure blood pressure once daily.
3. Give the patient sips of water for 2 hours. Thereafter a liquid diet is given as tolerated.
4. When the rectal temperature is 99.6° F., give the patient a bath and change pajamas.
5. Bed rest should be continued overnight. Then patient may be ambulatory if the blood pressure and temperature are normal.
6. Signs and symptoms of nausea, vomiting, abdominal pain, cramps, pain in the extremities, herpes, prostration, and delirium should be reported to the doctor.

   Cerebral edema or dehydration are complications of fever therapy.

7. Send the first morning specimen post treatment to the laboratory for microscopic and albumin examination.
8. On the days between fever therapy treatments, measure temperature, pulse and respirations every 8 hours and blood pressure once daily. Give a regular diet with interval nourishments. Give two enteric-coated sodium chloride tablets after each meal.



Hypodermoclysis Set Assembled

HYPODERMOCLYSIS INFUSION

EQUIPMENT

Sterile hypodermoclysis set:
- Rubber tubing, 4″ and adaptor Vaco-drip.
- Glass Y-tube with 2 pieces rubber tubing 4′ and needle adaptors.
- 3 clamps, one attached to each section of tubing.
- 2 needles, 22 G, 3″.
- 1 needle, 18 G, 2″.

Supplied by Ward
- Bottle of prescribed solution.
- Alidase (or other drugs, if ordered).
- Skin preparation tray.
- Standard.

Purpose: To supply the body with fluids through the subcutaneous tissues.

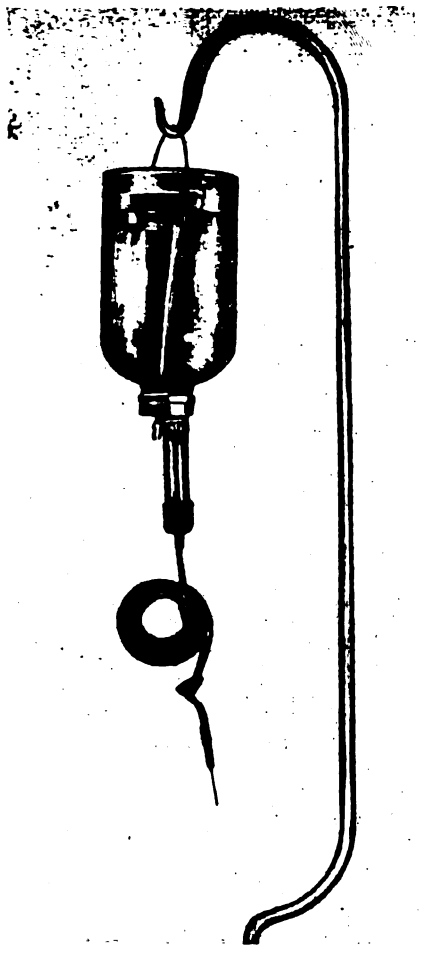
A. Procedure

1. Remove the metal cap from the solution bottle and wipe stopper with alcohol sponge.
2. Insert adaptor on tubing set into the larger hole in the rubber diaphragm of the solution bottle. Close the control clamp. Insert a No. 18 G needle into the air vent in the stopper.
3. Invert bottle and hang on standard. Allow a small amount of solution to run through tubing and close clamp on each branch of the tubing.
4. Prepare the site of injection.
5. The doctor routinely inserts the needles for the hypodermoclysis.
6. Regulate rate of inflow. Observe frequently for swelling due to collection of fluid at site of injection. Area may be massaged gently to increase circulation in the part and aid in the distribution and absorption of fluid. Hot water bottles (105° F.) may be placed on the thighs, covering the tubing above the site of injection, to aid in absorption and lessen the discomfort to the patient.
   Alidase or other allied drugs may be ordered to speed absorption of fluid.
7. To discontinue, clamp tubing and withdraw needles. Apply sterile gauze sponges to the puncture sites.
8. Record in nurses' notes: Type and amount of fluid, time started and discontinued, and patient's tolerance.

B. Care of Equipment

Wash articles, rinse tubing with clear water. Wrap set for return to Centralized Matériel Section.

If disposable type bottle and tubing are used, discard them.



Intravenous Set Assembled

INTRAVENOUS SET

EQUIPMENT

Sterile intravenous set (disposable type):
- Plastic tubing.
- Drip bulb.
- Clamp.

1 needle, 18 G, 2″.
1 needle, 20 G, 2″.
Bottle of prescribed solution

Supplied by Ward
- Skin preparation tray.
- Tourniquet.
- Small rubber sheet and towel.
- Standard.
- Arm board.

Preparation of Intravenous Set

1. Remove outer seal and metal disc from solution bottle exposing the holes in the stopper. Insert needle, 18 G, into air vent in stopper.
2. Remove protector from drip device and insert end into the larger hole in the stopper of the bottle. Close the control clamp.
3. Remove protector from needle adaptor and attach needle, 20 G. Allow needle to remain in constriction tube to preserve sterility.

INTRAVENOUS INFUSION

Purpose: To supply fluid, to restore blood volume to dilute and encourage elimination of toxins.

METHOD	IMPORTANT POINTS
A. Procedure	
1. Immobilize arm, prepare site of injection and place tourniquet in position.	Left arm is used unless otherwise directed in order to leave right arm free for patient's use
2. Suspend bottle on the standard about 2 feet above the level of the patient's arm. Expel air from the tubing.	
3. The doctor performs the venipuncture and adjusts the initial flow of solution	Ten drops approximate 1 cc. Eighty drops per minute will deliver one liter in about 2 hours.

***A. Procedure*—Continued**

4. Secure needle in place with adhesive strips. Take patient's pulse and observe rate of flow at frequent intervals. If swelling occurs at site of injection or other untoward symptoms develop clamp tubing and notify doctor at once.
5. To change bottles when additional solution is ordered, prepare second bottle as outlined in step No. 1. Pinch tubing to prevent air from entering and transfer the drip device to the second bottle.
6. To discontinue the infusion, clamp tubing, withdraw needle and apply pressure with gauze over puncture site until bleeding stops.
7. Record in nurses' notes: Time infusion was started and discontinued, kind and amount of solution, by whom given, and patient's reaction.

B. Care of Equipment

1. Wash articles and return to Centralized Matériel Section.
2. Intravenous bottles and tubing (disposable type) are discarded.

INTRAVENOUS INJECTION

Purpose: To inject a drug into the vein when immediate absorption is desired, or when other methods of administration are contraindicated.

A. Equipment

1 sterile syringe, size as ordered.
1 needle, 20 G, 2″.
Prescribed intravenous medication.
Skin preparation tray.
Tourniquet.
Arm board.
Rubber sheet and towel.

B. Procedure

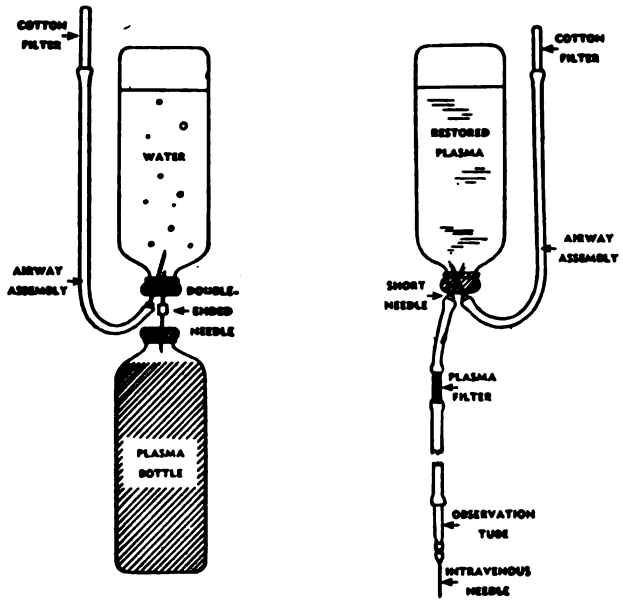
1. The doctor administers all intravenous medications. The nurse prepares the syringe and medicines.

Save container from which medicine was taken so doctor may confirm the medication he administers.

2. Disinfect the site of injection. Any large or easily accessible vein is used such as the one in the antecubital fossa. Place tourniquet in position about 2 inches above where the needle will enter.
3. The doctor tightens the tourniquet, stretches the skin, anchors the vein with his thumb, and inserts the needle. When blood appears in the syringe, he releases the tourniquet and skin tension and injects the drug slowly.
4. When the needle is withdrawn, apply pressure over the puncture site with gauze until bleedling stops.
5. Record in nurses' notes: Medicine, amount, by whom administered, and reaction of patient.

C. Care of Equipment

Wash syringe and needle. Place in supply basket for return to Centralized Matériel Section.



Restoration of the Dried Plasma — Plasma Unit Assembled

PLASMA UNIT

Plasma unit consisting of:
- 1 bottle plasma, normal human dried.
- 1 bottle, plasma diluent, 500 cc.
- Intravenous tubing set:
  - Short needle.
  - Filter.
  - Needle adaptor.
  - Two-way needle.

Intravenous tubing set—Continued
- Needle, hypodermic, 18 G, 1 ½″
- Clamp.
- Airway assembly:
  - Tubing, 12″.
  - Filter (with cotton).
  - Short needle.
- Suspension tapes.

SUPPLIED BY WARD

Skin preparation tray.
Tourniquet.
Arm board.
Standard.

INTRAVENOUS INFUSION OF PLASMA

Purpose: To increase blood volume following hemorrhage, to restore plasma in cases of shock or dehydration, or to provide blood products for supportive purposes in certain disease conditions.

METHOD

IMPORTANT JOINTS

A. General Instructions

1. Request plasma unit on Centralized Matériel Requisition.
2. Plasma should be used promptly after restoration.

B. Procedure to Restore Plasma

1. Cleanse the bottle stoppers with alcohol.
2. Remove the glass protector from one end of the two-way needle. With the diluent bottle in the upright position, insert the uncovered needle through the rubber stopper.

   It is important that the needle not to be inserted into the plasma bottle first, otherwise the vacuum would be destroyed.
3. Remove the glass protector from the airway needle and insert the needle through the stopper of the diluent bottle.

B. Procedure to Restore Plasma—Continued

4. Expose the opposite end of the two-way needle. Invert the diluent bottle and insert this end of the needle through the stopper of the plasma bottle.
   Keep free end of the airway assembly elevated to prevent water from wetting the cotton filter in the airway.
5. Allow the diluent to be drawn into the plasma bottle. Should the vacuum be lost, remove both stoppers and pour the diluent into the plasma bottle. Replace the stopper in the plasma bottle and continue with procedure.
6. Remove the two-way needle and the empty diluent bottle. Leave airway assembly intact to preserve sterility. Gently agitate plasma bottle until the plasma is completely dissolved.
7. Expose the short needle on intravenous tubing and insert through stopper of plasma bottle. Tighten clamp on tubing.
8. Transfer the airway needle from the diluent bottle to plasma bottle.
9. Invert the plasma bottle and hang it on the standard by the suspension tape. Keep the airway elevated by tucking the glass end under the suspension tape.
   Remove protectors from tubing adaptor and intravenous needle. Attach needle to the adaptor and allow plasma to fill the tubing. Clamp tubing.

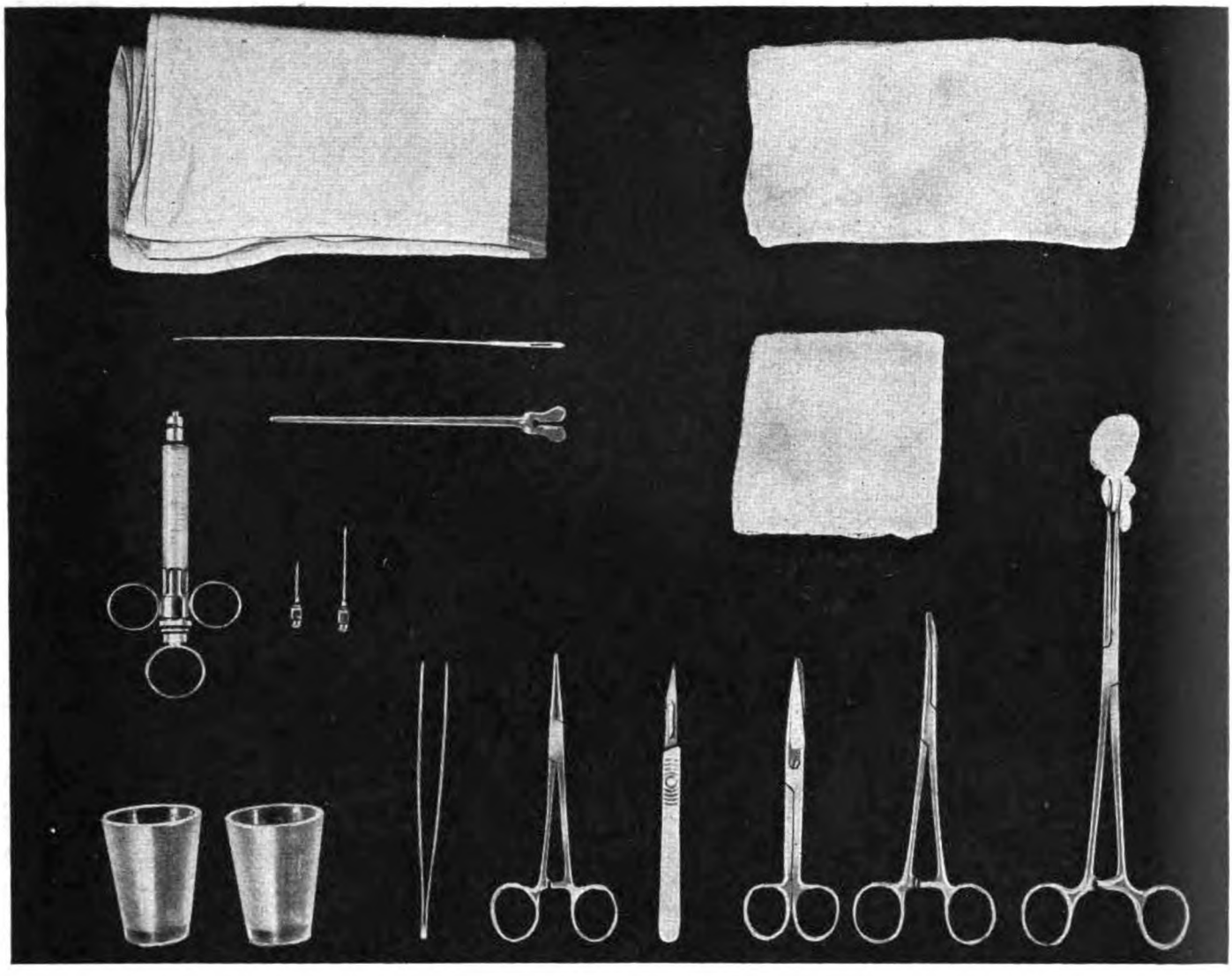
If the cotton in the bottle becomes wet, remove it.

C. Procedure for Administering Plasma

1. Administer plasma in the same manner as any intravenous infusion.
2. If additional plasma is to be given, restore second bottle of plasma as outlined.
   Transfer the needle from the first bottle to the second bottle, while pinching the intravenous tubing to prevent it from filling with air.
   Suspend bottle and elevate end of airway fixing it in place with the suspension tape.
3. Record in nurses' notes: Time, amount of plasma, site of injection, by whom administered, patient's reaction.

D. Care of Equipment

1. Bottle and tubing set are discarded.
2. Wash and dry needles, place in basket for return to Centralized Matériel Section.



INCISION AND DRAINAGE TRAY

2 medicine glasses.
1 forceps, tissue, smooth, 5½″.
1 forceps, mosquito, straight, 5″.
1 knife handle No. 3, with No. 11 blade.
1 scissors, suture.
1 forceps, Kelly, curved, 6¼″.
1 forceps, sponge, 9″ with sponge.
1 syringe, Luer-Lok, 3 cc.
1 needle, hypodermic, 23 G, ¾″.
1 needle, hypodermic, 20 G, 1½″.
1 director, grooved, 5½″.
1 probe, straight, 8″.
4 sponges, gauze, 4″ x 4″.
3 towels.
4 sponges, gauze, 4″ x 8″.

SUPPLIED BY WARD

Skin preparation tray.
Sterile gloves.
Procaine solution, 1% or 2%.
Ethyl chloride.

Care of Equipment

1. Wash, dry and replace instruments on tray.
2. Rewrap tray for return to Centralized Matériel Section.

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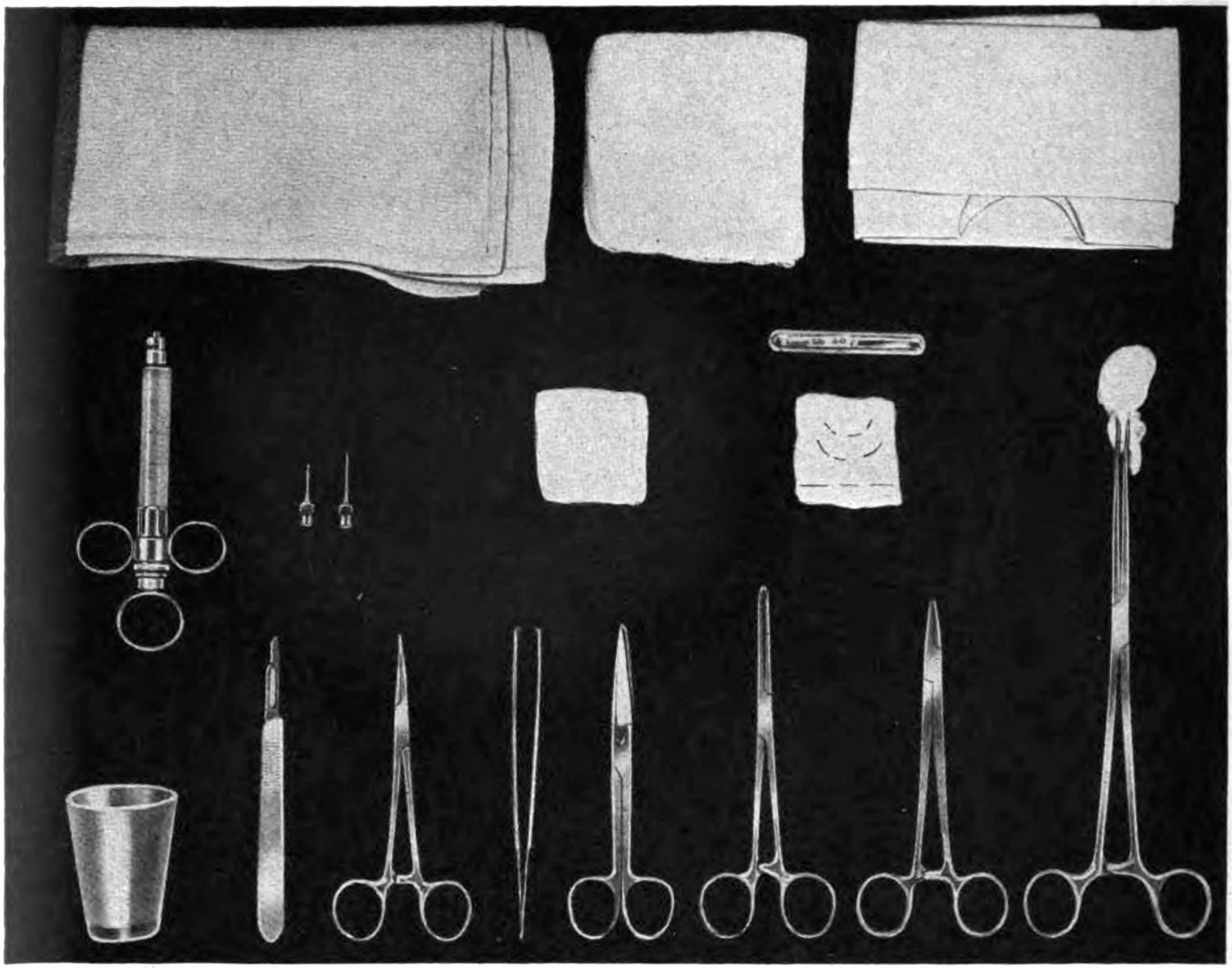


MINOR SUTURE TRAY

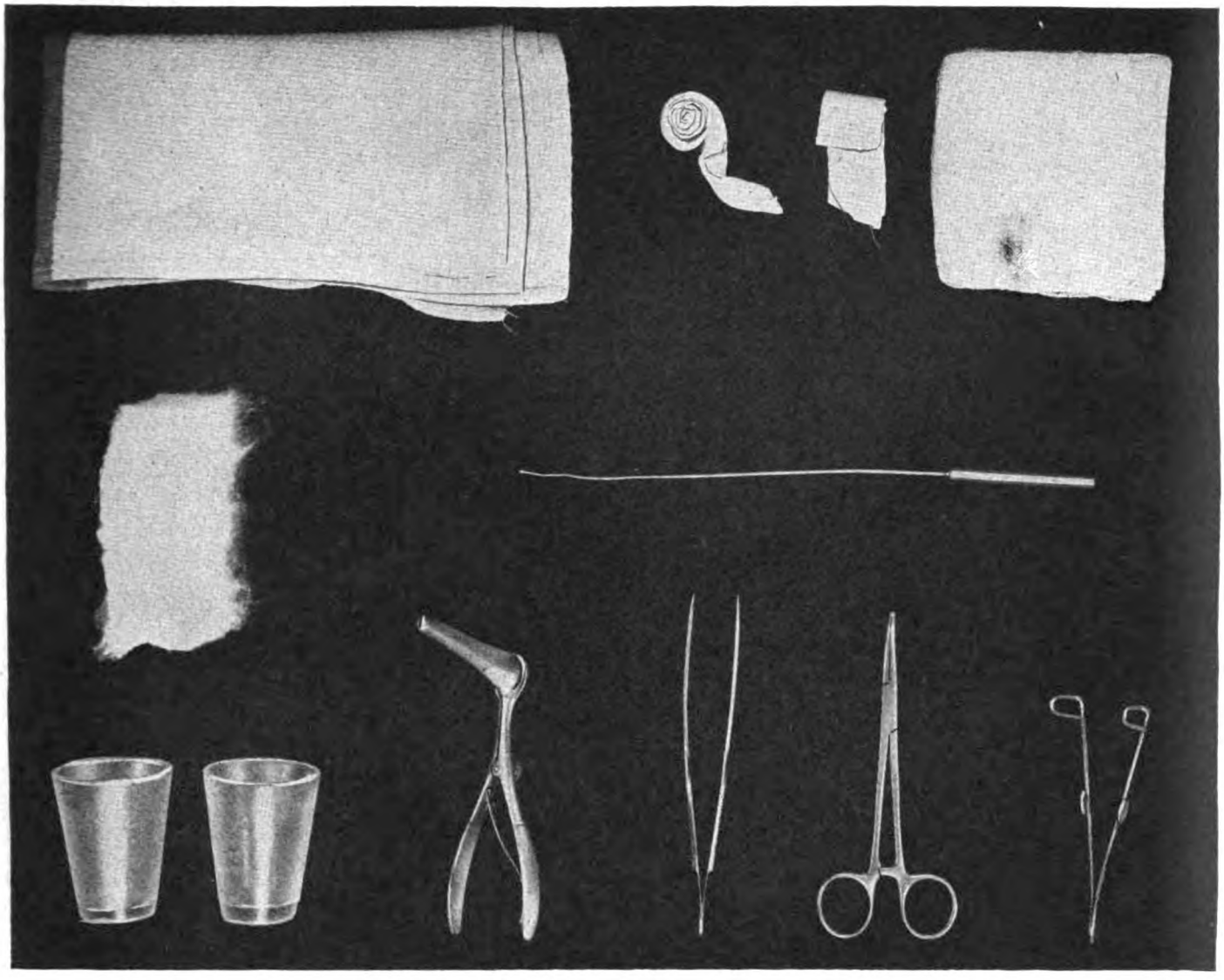
1 medicine glass.
1 knife No. 3, with No. 15 blade.
2 forceps, Kelly, curved, 5½″.
1 forceps, tissue, mouse-tooth, 5½″.
1 scissors, suture.
2 forceps, Allis.
1 needle holder.
1 forceps, sponge, 9″ with sponge.
1 syringe, Luer-Lok, 3 cc.
1 needle, hypodermic, 26 G, ½″.
1 needle, hypodermic, 23 G, ¾″.
6 sponges, gauze, 4″ x 4″.
6 sponges, gauze, 2″ x 2″.
1 needle, Keith, straight.
1 needle, suture, curved, cutting, No. 18.
1 needle, suture, curved, cutting, No. 12.
1 suture silk, 3–0.
2 towels.
1 biopsy sheet.

SUPPLIED BY WARD

Skin preparation tray.
Sterile gloves.
Procaine solution, 1%.

Care of Equipment

1. Wash, dry and replace instruments on tray.
2. Rewrap tray for return to Centralized Matériel Section.



NASAL PACKING TRAY

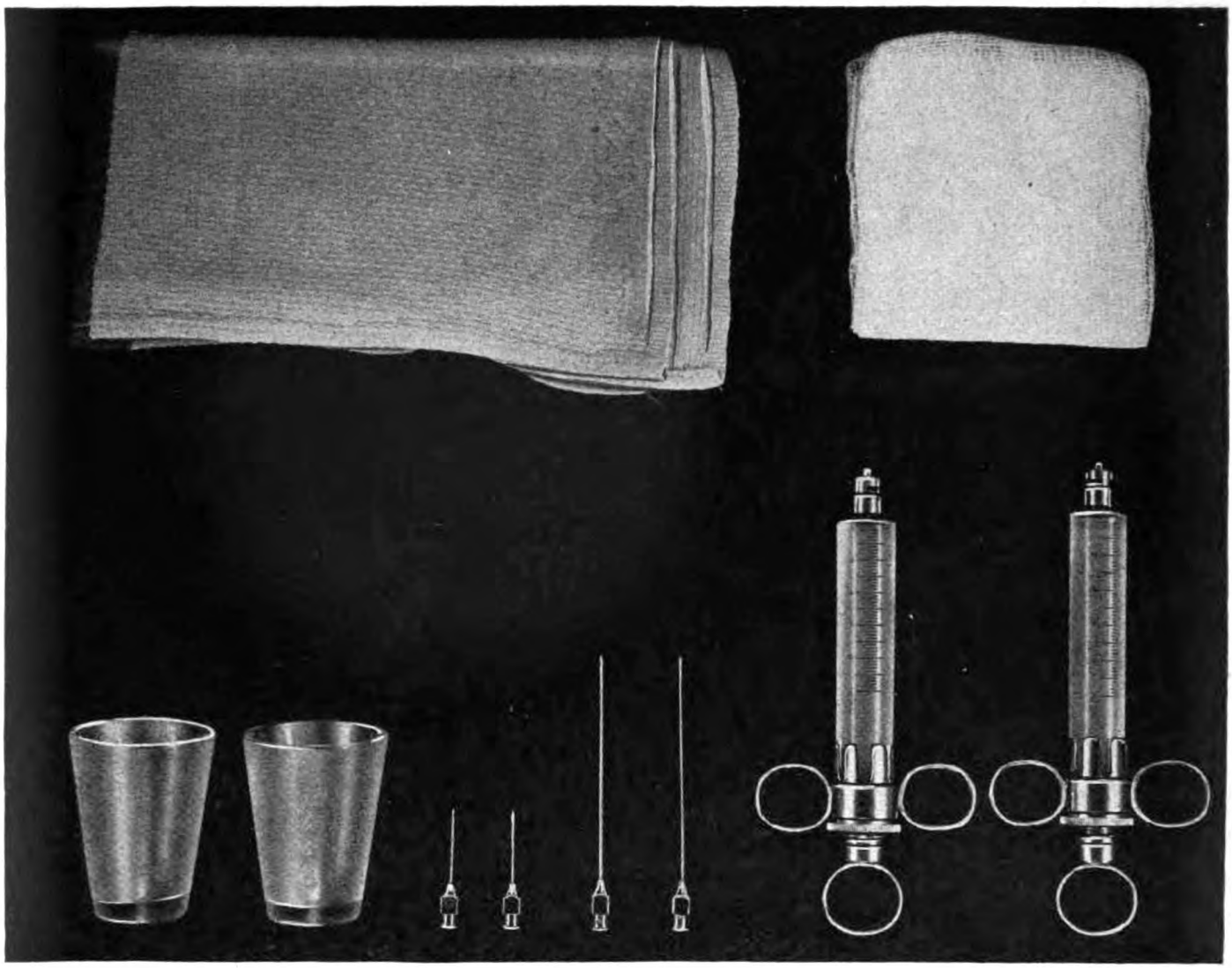
2 medicine glasses.
1 speculum, nasal, Killian.
1 forceps, ear, angular.
1 forceps, Kelly, curved, 5½″.
1 speculum, nasal, Bosworth.
1 wad cotton, absorbent.
1 applicator, nasal, spiral end, 6″.
2 towels.
1 packing, gauze, 1″.
1 packing, gauze, ½″.
6 sponges, gauze, 4″ x 4″.

SUPPLIED BY WARD

Tongue depressors.
Scissors.

Care of Equipment

1. Wash articles and return to tray.
2. Rewrap tray for return to Centralized Matériel Section.



NOVOCAIN INJECTION TRAY

2 medicine glasses.
2 needles, hypodermic, 22 G, 1″.
2 needles, hypodermic, 22 G, 3″.
2 syringes, Luer-Lok, 10 cc.
2 towels.
4 sponges, gauze, 4″ x 4″.

SUPPLIED BY WARD

Skin preparation tray.
Novocain 1%–2% solution (Procaine).
Razor and blades.

Care of Equipment

1. Wash, dry and replace articles on tray.
2. Rewrap tray for return to Centralized Matériel Section.

COLD WET SHEET PACK

Purpose: To produce desired sedative effect by application of cold to the entire body in cases of sleeplessness, hyperactivity and excitement.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. Only authorized personnel are permitted to enter the room while patient is in the pack.	
2. Explain the treatment to the patient if possible. The cold wet sheet pack is a treatment and should never be used as a form of punishment.	
3. A minimum of two persons is required to apply the pack.	
4. The patient is never left alone while he is in the sedative pack. If an attendant stays with the patient, the nurse will observe the patient's condition frequently.	
B. Equipment	
Bed or pack table covered with full size rubber sheet. Pillow incased in rubber sheeting. Six sheets. Two blankets. One towel. Ice bag with cover. Hot water bottle with cover.	
C. Preparation of Pack	
1. Wet 4 sheets in cold water and wring as dry as possible.	48° F. is desirable for very excited patients; 92° F. for a frail patient.
2. Place one blanket on the bed or pack table, 6 inches from the head; place a second blanket across the lower half of the bed so that the blanket extends beyond the foot of the bed.	
3. Place a wet sheet even with the foot of the bed, the greater part extending to the left side; fanfold this part to the edge of the bed.	
4. Place the second sheet even with the foot of the bed, the greater part extending to the right side; fanfold this part to the edge of the bed.	
5. Fold the third sheet in thirds and place at shoulder level across the bed.	
6. Fold the fourth sheet in quarters, crosswise, and place on the bed just below the third sheet.	
D. Administration of Treatment	
1. The patient should void and have his temperature, pulse and respirations recorded before the treatment is started.	
2. Remove the patient's clothing and place him in the dorsal position on the bed or pack table.	
3. Bring the right side of the upper cross-sheet up under the arm, cross over the arm and tuck in smoothly under the back so that the arm is pinioned firmly to the trunk. Repeat the procedure on the left side.	The patient's hands should be open and the fingers straight. Care should be taken so that all skin surfaces are separated.
4. Bring lower cross-sheet over the right leg, pass under and over the left leg and tuck in smoothly. Wrap the right side of sheet smoothly around both legs.	

D. Administration of Treatment—Continued

5. Wrap bottom sheet around patient first on the right side, then on the left; tuck under the body mummy fashion.
6. Place a dry towel around the patient's neck.
7. Bring the lower blanket up and tuck in envelope style over the feet. Place the hot water bottle in the folds of the blanket at the patient's feet. Enclose the entire body in the upper blanket.
8. Place one sheet, doubled, over the patient's chest and another over his knees and tuck under the mattress as a precautionary measure to keep him from falling out of bed. Give the patient a pillow if he wishes.
9. Place an ice bag at the patient's head.
10. Offer fluids freely while patient is in the pack.
11. Take and record pulse and respirations every 15 minutes during the treatment.
    The duration of the pack is usually 2 hours.

Keep room darkened, cool and quiet during the treatment.
Remove pack at once if unusual pallor, blueness of lips, flushing, rapid pulse or respirations are noted.

E. Aftercare of the Patient

1. Remove the pack at the specified time. Dry skin and rub body with alcohol. Apply lanolin to reddened areas.
2. Dress patient and return him to his ward.
3. Record time and duration of pack, patient's reaction, pulse and respirations noted during the treatment and amount of fluids given.

If pack is ordered for a longer period than 2 hours, the patient is removed at end of every 2 hours, exercised and massaged with lanolin.

NEUROPSYCHIATRIC THERAPEUTIC TECHNIQUES

COMBINED-SHOCK THERAPY

I. INSULIN AND ELECTRO-CONVULSIVE THERAPY

Purpose: To produce convulsions in patients who are in insulin coma by means of electric shock.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. Some patients respond more favorably to treatment when combinations of the shock therapies are given.	
2. Electro-convulsive therapy is given to selected patients when they have progressed to Stage II in insulin shock.	
3. When the patient has reached the stage of medium coma he is transported from the Insulin Unit to the treatment room, by litter, for treatment.	
B. Administration of Treatment	
1. The treatment is administered according to the procedure outlined for electro-convulsive therapy.	
2. Immediately after the convulsion, 60 cc. of glucose 30% is administered intravenously.	
C. Aftercare of the Patient	
1. The patient is returned to the Insulin Unit and placed in his bed. He should not be left alone until he regains consciousness.	
2. When the patient is sufficiently awake to drink, he is given 240 cc. sweetened orange juice.	
3. The patient may be confused, restless, or hyperactive upon awakening. Cereal and milk is given when he is able to eat.	
4. The patient should remain in bed until recovery is complete, usually within a half hour. The patient then bathes, dresses, and carries on his usual activities.	
5. Record in nurses' notes; Patient's behavior before and after treatment, and any untoward reactions noted.	The electro-convulsive Therapy record is completed by the doctor

II. INSULIN AND NONCONVULSIVE ELECTRO-STIMULATION

Purpose: To restore patient to consciousness following insulin therapy in cases where intravenous glucose is not administered or to assist in terminating prolonged coma when it occurs as a complication in insulin therapy.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. Electric stimulation is administered during Stage II and Stage III of insulin coma.	
2. The treatment is administered to the patient in his bed.	
3. Sodium pentothal is not required as patients in insulin coma are unconscious to pain stimuli.	
B. Administration of Treatment	
1. A sheet restraint is placed across patient's legs.	
2. The treatment is administered according to the procedure outlined for nonconvulsive electro-stimulation. The current is applied from 3 to 12 minutes depending upon the length of time required for the patient to regain consciousness.	Immediately following stimulation emotional outbursts of various patterns are observed, most frequently weeping and rage reactions.
C. Aftercare of the Patient	
1. When the patient has recovered sufficiently he is given 240 cc. orange juice.	
2. The patient should be closely attended until the emotional excitation subsides. This period usually lasts about 20 minutes. Protect the patient from injuring himself during this period.	
3. The patient should rest for one-half hour before getting up to bathe. The patient is given lunch at the usual hour. He should be encouraged to resume his usual activities.	
4. Record in nurse's notes: Time of treatment, behavior before and after treatment, and any untoward reactions noted.	

NEUROPSYCHIATRIC THERAPEUTIC TECHNIQUES

CONTINUOUS TUB BATH

Purpose: To produce the desired sedative effect on patients by immersion in a bath for a period of hours in order to relieve excitement, delirium, and agitation.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. Only authorized personnel are permitted to enter the room while patient is in the tub.	
2. A minimum of two persons is required to place the patient in the tub.	
3. Explain the treatment and reassure the patient if possible.	
4. The patient is never left alone while he is receiving treatment.	
B. Equipment	
Tub, hydrotherapy, white enamel, with Leonard Thermostatic water mixing valve.	
Canvas hammock and cover.	
Rubber ring, covered.	
Bath, thermometer.	
Wash cloth and a basin of water 50° F.	
Pitcher of water and drinking cup.	
Lanolin	
2 bath towels.	
2 sheets.	
1 face towel.	
C. Preparation of Bath	
1. Fill tub two-thirds full of water.	
2. Place bath thermometer at outlet of the tube and stabilize the temperature of the water to the desired degree, about 96° F.	Temperature of water should be maintained at 92°—98° F. throughout the treatment unless ordered otherwise.
3. Place the canvas hammock in the tub and cover it with a sheet. Place the canvas cover over tub. Fasten straps on the lower two-thirds of the canvas cover to the frame on the tub.	
D. Administration of the Treatment	
1. The patient should void. The temperature, pulse and respirations should be determined before the treatment is started.	Keep room semidark, quiet and free from drafts.
2. Undress the patient. Apply lanolin to his hands, feet, and all bony prominences.	
3. Put the patient on the canvas hammock and cover him with the canvas cover. Fasten all straps on cover to the frame on the tub.	Restraints must not be so tight that circulation is restricted.
4. Place a towel about the patient's neck to prevent irritation from the canvas cover. Support patient's head in the rubber ring.	
5. Apply cold compresses to patient's forehead during treatment.	Watch for suicide attempts, submersion, strangling. Remove patient from bath immediately if pulse becomes rapid, cyanosis or flushing appears, fainting, dulling and sign of heat prostration or if extreme restlessness or convulsive seizures occur.
6. Record pulse and respirations every 15 minutes. Observe patient's color and reaction and note anything unusual in the patient's condition.	
7. The usual length of treatment is 2 hours, unless ordered otherwise. If the bath is to be prolonged, the patient should be removed from the bath after 2 hours. He is allowed to remain out of the tub for 2 hours before the treatment is resumed.	
E. Aftercare of the Patient	
1. Dry the patient's body thoroughly. Rub skin briskly.	
2. Dress patient and permit him to rest in bed for a short while.	
3. Record in nurses' notes: Length of treatment, patient's condition during treatment, and his reactions after treatment.	

NEUROPSYCHIATRIC THERAPEUTIC TECHNIQUES

DIFFERENTIAL CEREBRAL STIMULATION

I. CONVULSIVE CEREBRAL STIMULATION

Purpose: To treat certain psychiatric disorders.

METHOD	IMPORTANT POINTS
A. General Instructions	
Instructions given for electro-convulsive therapy apply in this procedure.	
B. Equipment	
Electric shock machine, Offner type 736A with handle type electrodes. Container of sodium bicarbonate solution, 4%. Oxygen cylinder with regulator and face mask. Kreiselman resuscitator. Stretcher covered with rubber sheet. Pillow, tied in tight roll. Mouth gag (cotton and gauze). Towels. Rubber gloves. Equipment for emergency use: Cardiac and respiratory stimulants. Syringes. Needles. Air way.	
C. Preparation of Patient for Treatment	
Preparation is the same as outlined for electro-convulsive therapy procedure.	
D. Procedure in Differential Cerebral Stimulation, Convulsive Type	
1. The patient is placed on the stretcher in the supine position with a tightly rolled pillow under the dorsal spine.	
2. Three persons should be available to hold patient so that he will not injure himself.	
3. The nurse applies the electrodes which have been moistened in sodium bicarbonate solution.	Rubber gloves are used by nurse when handling electrodes.
4. The doctor adjusts and operates the machine. During the treatment and by direction of the doctor, the electrodes are shifted to different locations over the skull. The average treatment lasts about 4 minutes.	
5. Oxygen is administered. This is part of the treatment and is given following cessation of convulsions and on order of the doctor.	
E. Aftercare of the Patient	
The same care is indicated as for electro-convulsive therapy.	

II. NONCONVULSIVE CEREBRAL STIMULATION

Purpose: To treat certain psychiatric disorders.

METHOD	IMPORTANT POINTS
A. General Instructions	
Instructions given for electro-convulsive therapy apply in this procedure.	
B. Equipment	
Electric shock machine, Offner type 736A, with handle type electrodes. Container of sodium bicarbonate, 4% solution. Kreiselman resuscitator. Stretcher covered with rubber sheet. Gloves. Syringes, 10–20 cc. Needles, 20 G, 1½″. Sodium pentothal, solution 5%. Distilled water. Bronchoscope and tracheoscope. Basin with water. Equipment for emergency use: Cardiac and respiratory stimulants. Needles. Syringes. Air way.	
C. Preparation of Patient for Treatment	
Preparation is same as outlined in electro-convulsive therapy procedure.	
D. Procedure in Differential Cerebral Stimulation, Nonconvulsive Type	
1. The patient is placed on the stretcher in the supine position. 2. Prepare site for intravenous injection of sodium pentothal. The doctor administers the medication before the treatment is done. 3. Electrodes are applied to the temporo-parietal region and held in this position during the treatment. The average treatment lasts 2–3 minutes.	Extra persons to hold patient are not necessary since patient does not go into the convulsive state. Sodium pentothal is given to produce a hypnotic state.
E. Aftercare of the Patient	
1. Lift the patient carefully from the stretcher and place on bed in the dorsal recumbent position. 2. The patient is usually fully recovered within an hour after treatment. 3. The patient should be encouraged to resume his usual activities as soon after treatment as possible.	Immediately following stimulation, emotional outbursts of various patterns are observed, with weeping and rage reactions being the most common.

NEUROPSYCHIATRIC THERAPEUTIC TECHNIQUES

ELECTRO-CONVULSIVE THERAPY

(*Cerletti-Bini Technic*)

Purpose: To treat certain psychiatric disorders by inducing convulsions therapeutically.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. Electro-convulsive therapy is given on specified days at 0800 hours. Appointment schedules are distributed to the wards on Saturdays for the forthcoming week.	
2. Electro-convulsive therapy clearance is required for all patients before the treatment series is instituted. This includes an electrocardiogram, complete blood count, urinalysis, and X-rays of chest and spine.	
B. Equipment	
Electric shock machine: Rubber head band. Electrodes. Electrolytic jelly. Kreiselman resuscitator. Stretcher covered with rubber sheet. Pillow, tied into tight roll. Mouth gag, soft, absorbent type. Hand towel. Cleansing tissues or gauze squares. Equipment for emergency use: Respiratory and cardiac stimulants. Alcohol sponges. Sterile syringes and needles. Air way.	
C. Preparation of the Patient	
1. On the morning of the treatment the patient's temperature, pulse and respiration are recorded at 0630 hours. He is given breakfast at 0715 hours.	Reassure the patient regarding therapy.
2. The patient should be dressed in pajamas, robe and slippers. Supervise the patient's personal hygiene, remove eyeglasses, dentures, hairpins and other items. Instruct the patient to void before going to treatment room.	Preceding the treatment keep him occupied with games, music or reading material.
3. Bring the patient to the treatment room at the appointed hour. The patient should be encouraged to walk to the treatment room.	
D. Procedure in Electro-Convulsive Therapy	
1. The patient is placed on the stretcher in the supine position with a tightly rolled pillow under the dorsal spine.	
2. Electrolytic jelly is applied over the patient's temples and the rubber head band and electrodes are fastened in place.	
3. The mouth gag is inserted between the patient's upper teeth and tongue.	Watch that the lip or tongue is not wedged between the teeth and mouth gag.
4. The patient is held firmly by four attendants during the treatment. The first attendant holds the right arm and shoulder; the second, the right hip and leg; the third, the left arm and shoulder; the fourth, the left hip and leg.	

D. Procedure in Electro-Convulsive Therapy—Continued

5. The doctor adjusts and operates the apparatus.
   The nurse holds the patient's jaw in place to prevent dislocations or fractures.
   As the measured current is applied, there is momentary apnea followed by facial contortions and severe convulsions of the tonic-clonic pattern.
   The convulsive movements gradually cease, the patient's breathing returns to normal, and he falls into a stuporous sleep. The entire episode lasts about 30–45 seconds.

   The timing device on the machine is set to switch off the current in accordance with a predetermined time limit. In periods varying from 0.1 to 1.5 seconds, 70–130 volts of electricity may be transmitted through the patient's head.
6. The head band is removed and the head is cleansed of any remaining electrolytic jelly.
7. The patient is turned on his side and his head held so that the saliva drains from his mouth.
   The jaw is supported in order to prevent the tongue from obstructing the respiratory passage.

   If respirations are delayed following the convulsion, they may be established by applying slight pressure over the carotid sinus or by pressing on the diaphragm. Physical restraint or sedation is sometimes necessary during the post-convulsion excitement period.

E. Aftercare of the Patient

1. Lift the patient carefully from the stretcher and place on bed in the dorsal recumbent position.
2. Keep the patient warm and quiet until he has reacted.
   When the patient awakens he may be confused and unsteady on his feet. Recovery is generally complete in 30–60 minutes.
3. The patient should be encouraged to resume his normal activities as soon as possible following the treatments.

   Signs or symptoms of confusion, lethargy, pain or injury should be reported to the doctor at once.
4. Record in the nurses' notes the time, number of treatment in the series, type of convulsion, and any untoward reactions.

NEUROPSYCHIATRIC THERAPEUTIC TECHNIQUES

INSULIN THERAPY

I. INSULIN COMA THERAPY

Purpose: To produce a reversible hypoglycemia for the purpose of improving the personality functioning in certain mental disorders.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. Insulin therapy clearance is required for all patients before the treatment series is instituted. This includes an electro-cardiogram, X-ray of spine and chest, blood urea nitrogen, fasting blood sugar, complete blood count and hemoglobin and urinalysis.	
2. When clearance is obtained, the patient is transferred to the insulin ward and housed there until the treatment series is completed.	
3. One treatment is given each day, Monday through Friday. The remaining 2 days are known as "rest periods."	
4. Explain procedure to patient. Inform patient as to what is expected of him.	
B. Preparation of Patient for Treatment	
1. No heavy sedation is given the night before a treatment.	Recurrent hypoglycema reactions some time occur several hours after treatment. Reactions can be more easily observed if sedatives are omitted.
2. Food is withheld from 2200 hours the night before treatment until the completion of treatment the next morning.	
3. Patients are not permitted to smoke after 0800 hours on the morning they receive treatment.	
4. The patient dresses in pajamas. Dentures, eyeglasses, hairpins, jewelry, and other articles should be removed.	
C. Procedure in Insulin-Shock Therapy	
1. 0630—0700 hours. The patient is put to bed. The temperature, pulse, respirations and blood pressure are recorded. A single sheet restraint is placed across the patient's chest and secured firmly to sides of the bed.	
2. 0700—0730 hours. The patient is given the prescribed type and dose of insulin. Vitamin B. complex, 1 cc., intramuscularly, is given as ordered. Sodium dilantin is given to selected patients, as ordered, to control spontaneous convulsions. Pulse and respiration rates are determined and recorded every 15 minutes throughout the treatment. Blood pressure is measured every 30 minutes.	Marked variations in pulse may occur. An unusually slow weak, rapid and thready pulse rate should be reported to the doctor at once because it may be indicative of circulatory collapse.

3. 0730—0830 hours.
The treatment room is darkened and all activities are kept at a minimum.
A selected music program is provided throughout the hours of the treatment.

Shallow, irregular respirations are not uncommon. If severe respiratory embarrassment develops the hypoglycemia may have to be terminated in order to avoid respiratory failure.

4. 0830—0930 hours.
This is the period when the patient is entering Stage I (light coma).
The patient will manifest the following symptoms of approaching coma: Moderate perspiration, increased salivation, fine tremor, muscular relaxation, clouded consciousness and somnolence.
The patient may have water to drink.
Wipe perspiration from patient's face every few minutes. Make him as comfortable as possible.

Soft music is used to produce a soothing effect while the patient is entering the state of coma.
Thirst, hunger, and excitement are common symptoms.

5. 0930—1000 hours.
This is the period when the patient is entering Stage II (medium coma).
The patient will generally show the following symptoms: Dilated pupils (pupils still react to light), increasing excitement, rapid pulse, diaphoresis, flushing of skin, clonic spasms, myatonic twitching, sensory changes, gasping respirations, and gradual loss of environmental contact.
Determine the onset of coma so that the hypoglycemia can be terminated within the proper time limits. Some patients lapse gradually into coma, others become excited and confused before losing consciousness.
If patient should show signs of severe spasms, exophthalmus and fixed eyes notify the doctor immediately. Place mouth gag between patient's teeth.
During Stage II selected patients are given electro-convulsive therapy or electro-stimulation.

It is important to distinguish between the jerking movements which precede coma and the movements which indicate impending convulsions.

6. 1000—1100 hours.
This is the period in which the patient may enter Stage III (deep coma).
The patient does not respond to external stimuli.
The following signs are noted: extensor spasms, deepening stupor, lid reflex absent, loss of corneal reflex, loss of muscle tone, muscular flaccidity and depressed reflexes.
Turn patient on his side to allow saliva to drain from mouth. A mouth gag, airway or electric suction is sometimes required when there is excessive salivation.

If the precoma excitement is severe the treatment may have to be terminated in order to avoid exhaustion and circulatory collapse.

D. Termination of Treatment

Hypoglycemia is usually terminated about 4 hours after the injection of insulin. The treatment, however, may be terminated at any time, on order of the doctor, depending on the response of the individual patient or if complications develop. Methods for termination of the treatment include the oral ingestion of orange juice, electro-stimulation, or administration of dextrose, 30%, intravenously.

Orally: If the patient has not progressed beyond Stage I by 1030 or 1100 hours, he is given sweetened orange juice to drink. An 85% sucrose mixture is added to the orange juice.

Intravenously: When electro-stimulation is contraindicated, or a poor response is obtained from the stimulatory therapy, a 30% dextrose infusion is administered.

When intravenous injections cannot be given because of the condition of the veins, orange juice and glucose solution are administered by tube feeding.

If complications develop during the treatment, dextrose may be given intravenously at any stage to terminate treatment.

Electro Stimulation: Used in second and third stage coma. Electro-stimulation may be applied to restore consciousness without resorting to the use of intravenous dextrose.

E. Complication

1. Prolonged Coma—The patient may not respond normally to termination by intravenous dextrose. Electro-stimulation as well as additional intravenous glucose is then administered. Gastric feedings may also be necessary to maintain a constant reservoir of sugar in the intestinal tract until such time as a normal blood sugar level is obtained and the patient regains consciousness.
2. Delay Reactions—Although only a single dose of insulin is administered on the treatment day, the effects may extend throughout the succeeding 24-hour period.

   This state is frequently observed after physical exercise, and when diet has been insufficient.

   Delayed reaction may be characterized by any or a combination of the following signs and symptoms: perspiration, confusion, irritability, flushed face, fine tremors or twitching, dilitation of pupils, rapid pulse, convulsions, and coma. This is an indication that the patient needs glucose. Orange juice, candy, or sugar cubes may be given. If the reaction is severe and patient loses consciousness, intravenous dextrose should be administered.

   Notify the doctor in charge or the Neuropsychiatry Officer of the Day at once.

F. Aftercare of the Patient

1. Patients are given a shower and dry clothing when the treatment is completed.
2. Dinner is served to the patients on the ward.
3. Patients are encouraged to enter into all ward activities.
4. Record in nurses' notes time insulin was given, progress of patient throughout treatment, type of coma obtained, method of termination of treatment, time of termination.

II. SUBCOMA INSULIN THERAPY

Purpose: To produce a mild hypoglycemia for sedative purposes in patients with severe anxieties.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. Subcoma insulin therapy is a modified form of insulin therapy. It differs from insulin shock therapy in that the dosage of insulin given is insufficient to produce the characteristic deep hypoglycemic coma. An initial injection of insulin is given and the dose is increased daily until the desired results are obtained. The length of a daily treatment is usually 2 to 2½ hours.	
2. Insulin therapy clearance is required before the treatment series is instituted. This includes the following tests: Fasting blood sugar, nonprotein nitrogen and urinalysis.	
B. Preparation of Patient for Treatment	
1. No heavy sedation is given the night prior to treatment.	
2. Food is withheld from 2200 hours the night before treatment until the completion of treatment the next morning.	
3. Patients are not permitted to smoke on the mornings they receive treatment.	
C. Procedure in Subcoma Insulin Therapy	
1. The patient's temperature, pulse, and respirations are recorded at 0630 hours.	
2. Insulin, as ordered, is administered at 0700 hours. The patient remains in bed during the treatment.	
3. Pulse and respiration rates are determined and recorded every 15 minutes throughout treatment. Blood pressure is measured every 30 minutes.	
4. After 30 minutes to 1 hour early symptoms of hypoglycemia appear. The patient will complain of hunger and thirst. Mild perspiration, sleepiness and dilated pupils are evident. The patient may have water if desired.	
5. Observe the patient closely as the reaction is intensified. When the patient appears to be on the verge of coma it is time to terminate the hypoglycemia. Diaphoresis, extreme drowsiness, thickened speech, and yawning are significant symptoms in this period.	The patient should not be allowed to lapse into coma.
D. Termination of Treatment	
At 0930 hours the treatment is terminated by feeding the patient breakfast.	
E. Aftercare of the Patient	
1. After breakfast the patient dresses and carries on with his usual activity schedule.	The patient should be observed for signs and symptoms of secondary reactions for several hours after treatment.
2. Record in nurses' notes: Time, amount of insulin, time and description of early symptoms, description of late symptoms, hour when hypoglycemia was terminated, food and fluids taken.	

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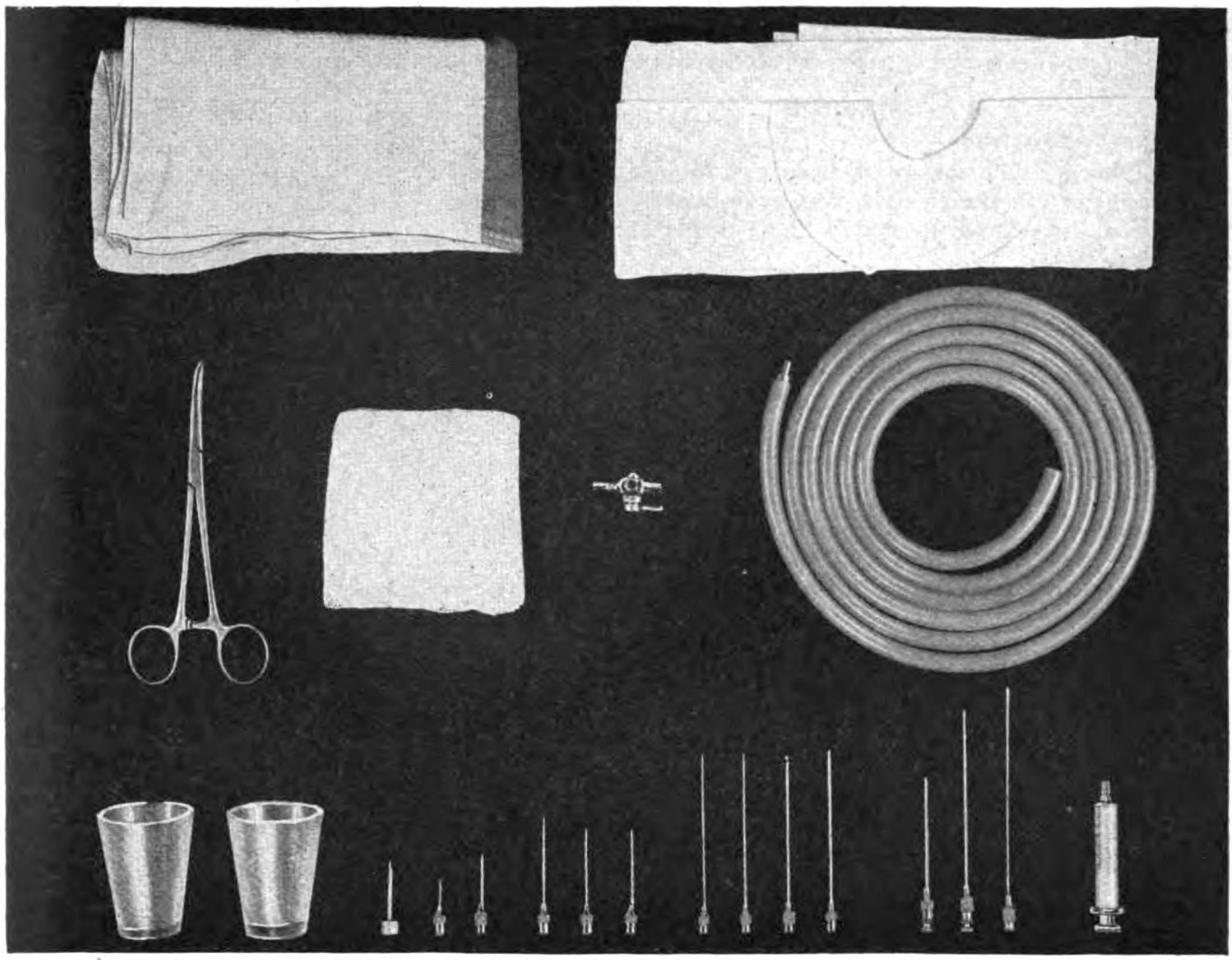
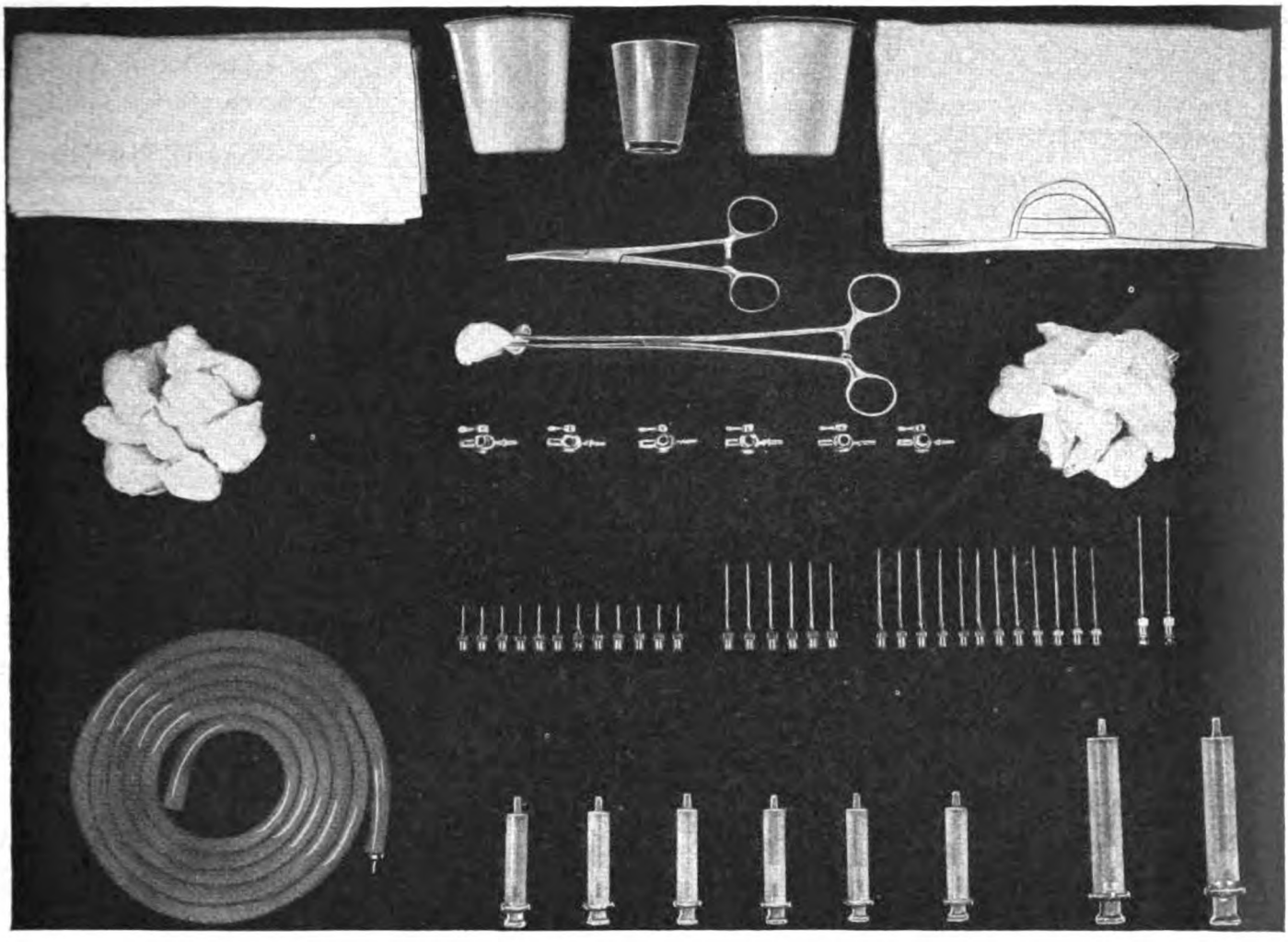


PNEUMOTHORAX TRAY (INITIAL)

2 medicine glasses.
1 needle, pneumothorax, 14 G, 1¼″.
1 needle, hypodermic, 26 G, ½″.
1 needle, hypodermic, 22 G, 1″.
1 needle, hypodermic, 19 G, 2″.
2 needles, hypodermic, 20 G, 2″.
2 needles, hypodermic, 22 G, 3″.
2 needles, hypodermic, 17 G, 3″.
1 needle, pneumothorax, 18 G, 2¼″.
1 needle, spinal, short bevel, 18 G, 3″.
1 needle, hypodermic, 20 G, 4″.
1 syringe, 2 cc.
1 forceps, Kelly, curved, 6¼″.
4 sponges, gauze, 4″ x 4″.
1 three-way stopcock.
2 towels.
1 biopsy sheet.
1 rubber tubing, 5′, with metal adaptor.

SUPPLIED BY WARD

Sterile gown and mask.
Sterile gloves.
Towels.
Sheets.
Small oxygen cylinder with mask attachment.
Pneumothorax apparatus.
Tincture merthiolate, 1:1000.
Antiseptic wash, 70%.
Procaine solution, 1%.
Cardiac and respiratory stimulants.



PNEUMOTHORAX TRAY (MULTIPLE)

1 rubber tubing, 5′ with metal adaptor.
6 syringes, 2 cc.
12 needles, hypodermic, 26 G, ½″.
6 needles, hypodermic, 20 G, 2″.
12 needles, hypodermic, 19 G, 2″.
2 needles, pneumothorax, 18 G, 2¼″.
6 three-way stopcocks.
2 syringes, 10 cc.
20 sponges, gauze, tonsil.
1 forceps, sponge, 9″, with sponge.
1 forceps, Kelly, curved, 6¼″.
10 towels.
2 medicine cups, enamel.
1 medicine glass.
10 biopsy sheets.

SUPPLIED BY WARD

Sterile gloves.
Sterile gowns and masks.
Towels.
Sheets.
Small oxygen cylinder, with mask attachment.
Pneumothorax apparatus.
Tincture merthiolate, 1:1000.
Antiseptic wash, 70%.
Procaine solution, 1%.
Cardiac and respiratory stimulants.

PNEUMOPERITONEUM

Purpose: To introduce air into the peritoneal cavity in amounts sufficient to cause the diaphragm to rise in the thorax thus compressing the diseased part of the lung and preventing it from functioning in respiration.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. The "Pneumo" Clinic is held on the day and ward at time as scheduled.	
2. All patients have a fluoroscopic examination preceding the pneumoperitoneum.	
3. Personnel and patients will adhere to isolation regulations governing the treatment room.	
4. The pneumothorax tray is used for the pneumoperitoneum procedure.	
B. Preparation of Equipment	
1. Set up a sterile table with equipment from the pneumothorax tray, arranging articles in the order they are to be used.	Use aseptic technique throughout the treatment.
2. Place the pneumothorax apparatus on a small table near the head of the examining table. Connect the attachment with the inflation bulb and air pressure reservoir bag to the valve on the apparatus marked "Bulb." Inflate the reservoir bag. Connect the straight tube attachment to the valve on the apparatus marked "Air."	
3. Wrap the sterile tubing (from the tray) in a sterile towel and place on table beside the apparatus; connect the end of this tube to the glass adaptor on the straight rubber tube attachment leading from the apparatus; clamp folds of the towel with a forcep to keep tubing in place on the table.	
C. Procedure	
1. The patient is placed on the treatment table in the dorsal recumbent position with his hands under the crest of the ilium.	
2. The doctor cleanses the skin, applies the sterile drapes, and infiltrates the region with procaine solution, 1%.	
3. The order in which he proceeds is: Connects a needle and a syringe to a three-way stopcock, attaches the stopcock to adaptor on the sterile rubber tubing, inserts the needle into the peritoneal space, notes the oscillations on the manometer and determines the pressure.	Instruct patient to control cough and avoid movement during the treatment.
4. The assistant records the pressure determination as the "Initial Pressure." (Doctor's Progress Notes, Standard Form 509 is used as the "pneumo" record.)	
5. The doctor adjusts the arm of the stopcock closing the valve leading to the syringe and opening the valve leading to the pneumo apparatus.	The patient's color, pulse and reaction to treatment should be watched throughout the procedure.
6. The assistant regulates the commutator valve of the apparatus under the direction of the doctor. A measured amount of air under measured pressure is injected slowly into the peritoneal space. Pressure readings are taken at frequent intervals.	Oxygen equipment should be on hand for emergency use.
7. When sufficient air has been injected the doctor determines the pressure.	
8. The assistant enters this pressure reading as the "Final Pressure" and records the total amount of air injected.	
9. The doctor will remove the needle, wipe the area with alcohol sponge, and apply collodion or a small dressing.	
10. Record in the nurses' notes: Treatment, by whom given, and patient's reaction.	

D. Care of the Patient

1. If this is the initial treatment the patient should rest flat in bed 4 to 6 hours.
2. Out-patients may leave the hospital following treatment if there are no untoward effects.
3. Instruct the patient to report any symptoms of discomfort, increasing dyspnea, pain in chest or cyanosis.

E. Care of Equipment

1. Wash articles in warm soapy water and replace on tray. Wrap tray for return to Centralized Matériel Section.
2. Wipe the pneumothorax apparatus and attachments with a cloth dampened in antiseptic solution. Replace parts in the storage compartment in the lid of the apparatus.

THERAPEUTIC PNEUMOTHORAX

Purpose: To introduce air into the pleural cavity in order to cause collapse of the infected area of the lung and to restrict the movements of the lung in respiration.

A. Preparation of Equipment

1. The preparation of sterile supplies and the pneumothorax apparatus is the same as outlined in the Pneumoperitoneum Procedure.

B. Procedure

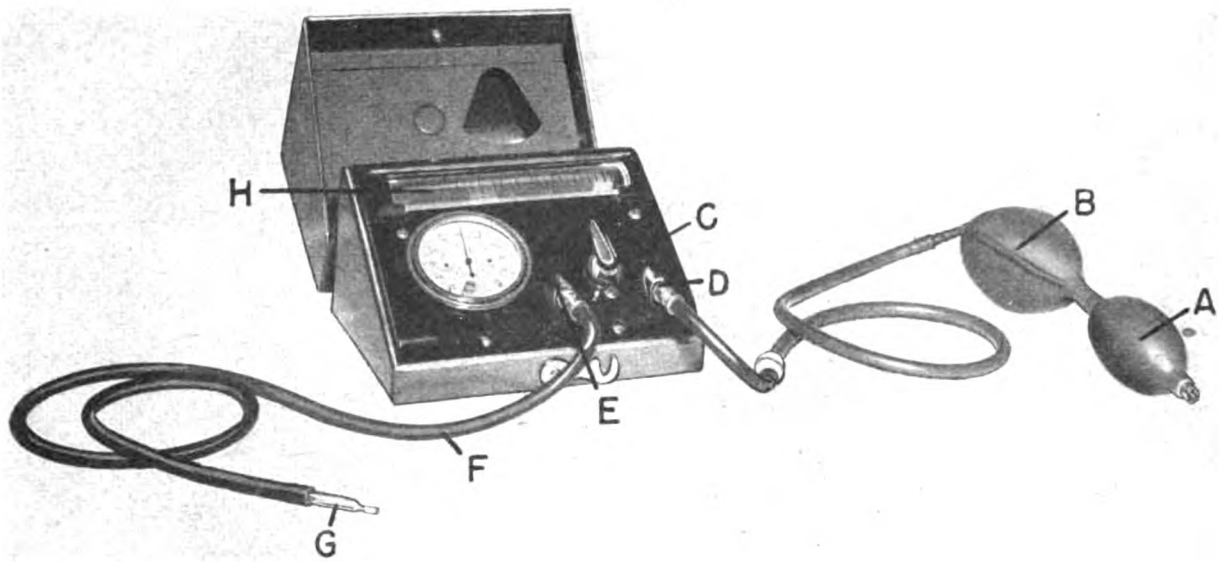
1. The patient is placed on the treatment table in the lateral position on the unaffected side. A small pillow is sometimes placed under the chest wall to widen the intercostal spaces on the opposite side.
2. The procedure is same as outlined for Pneumoperitoneum.

C. Aftercare of the Patient

1. The patient should lie on the pneumothorax side 4 to 6 hours.
2. Report any symptoms of discomfort, increasing dyspnea, pain in chest, cyanosis or blood spitting.

D. Care of Equipment

1. Wash articles in warm soapy water and replace on tray for return to Centralized Matériel Section.
2. Wipe the pneumothorax apparatus with a cloth dampened with antiseptic solution.



ANEROID PNEUMOTHORAX APPARATUS

A Inflation bulb.
B Air pressure reservoir bag.
C Valve, commutator.
D Valve, bulb.
E Valve, air.
F Straight tube.
G Adaptor, glass.
H Indicator, air measuring panel.

SPONTANEOUS PNEUMOTHORAX

Emergency Care of the Patient

Purpose: To provide emergency care and prompt treatment after spontaneous leakage of air into the pleural cavity.

METHOD	IMPORTANT POINTS
A. Symptoms of Spontaneous Pneumothorax	
A patient will suddenly and without warning develop a sudden, sharp pain in the chest, rapidly increasing dyspnea, rapid pulse, cyanosis, cough, faintness and state of near collapse accompanied by great apprehension.	Spontaneous pneumothorax is caused by a ruptured subpleural tuberculous cavity, by an emphysematous bleb on the surface of the lung, by a puncture wound or may occur spontaneously with unknown etiology.
B. Equipment	
Emergency chest set, sterile. Syringe, 10 cc. Chest needle. Stopcock, two-way. Pneumo pack, sterile. Pneumothorax apparatus. Gloves, sterile. Skin preparation tray. Oxygen, regulator and face mask. Thoracotomy set and drainage bottle (if needed).	
C. Emergency Care of the Patient	
1. Report symptoms to the doctor at once. 2. The patient should be reassured and not left alone. 3. Take oxygen equipment to the bedside and administer immediately. 4. Intra-pleural pressure is relieved by removal of air from the pleural cavity.	Promptness of treatment may be the means whereby the patient's life is saved.
D. Removal of Air From the Pleural Cavity	
1. Connect screw end of inflation bulb to the valve on the pneumothorax apparatus marked "Bulb" (which is exactly opposite to the method for injecting air). 2. Connect screw end of the straight tube attachment to valve on pneumothorax apparatus marked "Air." Attach glass connection tube on the opposite end of the straight tube attachment to the pneumotube (exactly as in giving air). 3. Set the commutator valve at "Off" and squeeze air from inflation bulb. Keep the inflation bulb compressed, turn commutator valve in the opposite direction to which the air measuring panel indicator is to move and immediately release the inflation bulb. 4. When the inflation bulb is fully inflated, the amount of air withdrawn can be determined by reading the indicator on the apparatus. 5. Turn commutator valve to "Off" each time before compressing the inflation bulb. 6. The procedure is repeated until the required amount of air has been withdrawn. 7. Record symptoms and treatment given on the patient's clinical record.	

RADIATION THERAPY

(*Deep X-Ray Therapy*)

Purpose: To administer a lethal dose of irradiation to malignant neoplasms and at the same time to limit injury to normal tissue.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. Send Consultation Sheet, Standard Form 513, in duplicate, the clinical record and all X-ray films to the Radiation Therapy Section. Do not send the patient until requested by the Radiation Therapy Section.	The most common complications of radiation therapy are nausea, vomiting, diarrhea, erythema of the skin and inflammation of the mucous membranes. Sloughing and hemorrhage may occur during or following the treatments.
2. The Radiation Therapy Section will notify the ward by telephone of the appointment for the first radiation treatment. Thereafter, the patient will receive the time for the next treatment on WD AGO Form 8–97.	Loss of hair in the irradiated area may be permanent or temporary, depending upon the total dosage.
3. An extra copy of all X-ray, laboratory, or other pertinent reports on the patient should be ordered for the Radiation Therapy Section while the patient is receiving irradiation. This copy should be designated for "Radiation Therapy."	
4. Send the patient to the Radiation Therapy Section at the scheduled hour for the treatment.	
B. Care of the Patient	
1. A complete blood count is made weekly during the course of the treatment.	The lymphatic tissues and the bone marrow are highly sensitive to radiation. It is a good prognostic sign if the leukocyte count begins to return toward normal in about a week after the initial exposure.
2. Instruct the patient to avoid exposure to sunlight of the irradiated areas.	
3. Because loss of appetite is apt to be present, the patient is placed on a selected diet which should be high in protein and caloric values. The minimum daily fluid intake should be 3,000 cc. to offset fluid loss.	
4. Dramamine, 50 mg., for immediate relief of nausea and vomiting or pyridoxine hydrochloride, 100 mg., 1.M., 1 hour before the treatment in cases of persistent nausea and vomiting, is given as ordered.	
5. Bismuth preparations are contraindicated during the course of treatments. Paregoric (without bismuth) is given for the relief of diarrhea.	Since bismuth is a metal it will cause secondary irradiation. Radiation is therefore increased and bowel tissue may be injured.
6. Watch for skin reactions at the site of exposure—erythema which may be followed by radiodermatitis.	
7. Vaginal irrigations or throat irrigations are given as ordered for the relief of mucositis of the oral cavity or vaginal tract.	The word "burn" should never be used in describing a skin reaction from radiation.
8. Systematic reactions will require nursing care and medical treatments as indicated and will vary with individuals.	
9. Consideration of the mental well-being of the patient along with the maintenance of general good health and personal hygiene are important nursing care measures.	

RADIUM IMPLANTATION

Purpose: To destroy radiosensitive, malignant cells through the direct application of radium into an organ or interstitial tissues.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. Radium implantations are performed in the operating room.	Radium is a metallic, radioactive element which constantly emits radiant energy.
2. The patient is prepared for radium implantation in the same manner as for any operative procedure.	
3. All patients with the exception of those on the Pediatric Section are kept in the Recovery Room until the radium is removed.	
B. Care of the Patient	
1. The patient is kept in an isolated area until the radium is removed.	
2. Place a sign, "Caution Radium" on the foot of the bed.	
3. When radium has been implanted through the vaginal tract, inspect all bedpan contents before disposal in the event the radium may have become dislodged. Notify the doctor and the Radiation Therapy Section immediately if the applicators of radium become dislodged.	Dislodged radium should always be handled with a long forceps.
4. Elevations in temperature should be reported to the doctor.	Increasing fever may indicate that the formation of a radium ulcer is in progress and that the radium should be removed.
5. Postoperative medications and treatments are given as ordered.	
C. Removal of Radium	
1. Removal of radium from the patient at the scheduled time is the responsibility of the Radiation Therapy Section.	Intravaginal and intrauterine implantations can cause ulcers in the vagina, rectum or bladder. Vesicovaginal or rectovaginal fistulae might develop with resultant leakage of urine or feces through the vagina.
2. The patient is sedated prior to the removal as ordered.	
3. Have ready at the patient's bedside: 1 pair gloves, sterile. 1 package of Kelly clamps, sterile. 1 pair scissors, unsterile. 1 basin, curved. 1 sheet, for draping. Container for vaginal pack (as needed). The radium carrier and the special forceps for handling the radium are supplied by the Radiation Therapy Section.	
4. The radium is returned to the Radiation Therapy Section by the radiologist.	

SODIUM AMYTAL TEST

Purpose: To determine the effects of relaxed sleep on blood pressure.

METHOD

A. General Instructions

1. Ward patients are moved to a single room or into the treatment room for the test.
2. The patient should be in bed and at rest for at least 30 minutes prior to beginning the test.
3. Side boards are placed on the bed.
4. Smoking is not permitted during the period of the test.

B. Equipment

Sphygmomanometer.
Stethoscope.
Sodium amytal as ordered.
Plotting Chart, Standard Form 512.

C. Form to Follow in Plotting the Chart

1. Fill in all blanks with proper information.
2. Number squares on left margin in intervals of 5 beginning at the bottom of page.
3. Hour of each recording—write perpendicularly just above plotted area.
4. *Sodium amytal*—record perpendicularly near top of plotting area at each time of administration.
5. *Respiration*—write in the left margin opposite the first group of squares (5—25). Use a "dot" for recording respirations.
6. *Pulse*—write in the left margin opposite the second group of squares (35—50). Use an "X" for recording the pulse.
7. *Blood pressure*—write "Blood Pressure" in margin opposite square where first recording appears. Use a "dot" for recording on the plotting graph.

D. Procedure

1. At 1900 hours the patient's blood pressure, pulse, and respirations are measured and recorded on the plotting chart.
2. Sodium amytal, 0.2 Gm., is administered orally at 1900, 2000, and 2100 hours unless otherwise ordered.
3. The blood pressure, pulse, and respirations are measured and recorded on the plotting chart at each time the sodium amytal is given.
4. The blood pressure, pulse, and respirations are recorded hourly until 0700, inclusive. Record in the same column whether the patient is awake or asleep.
5. After the test is completed assist the patient as needed until he has fully reacted.

IMPORTANT POINTS

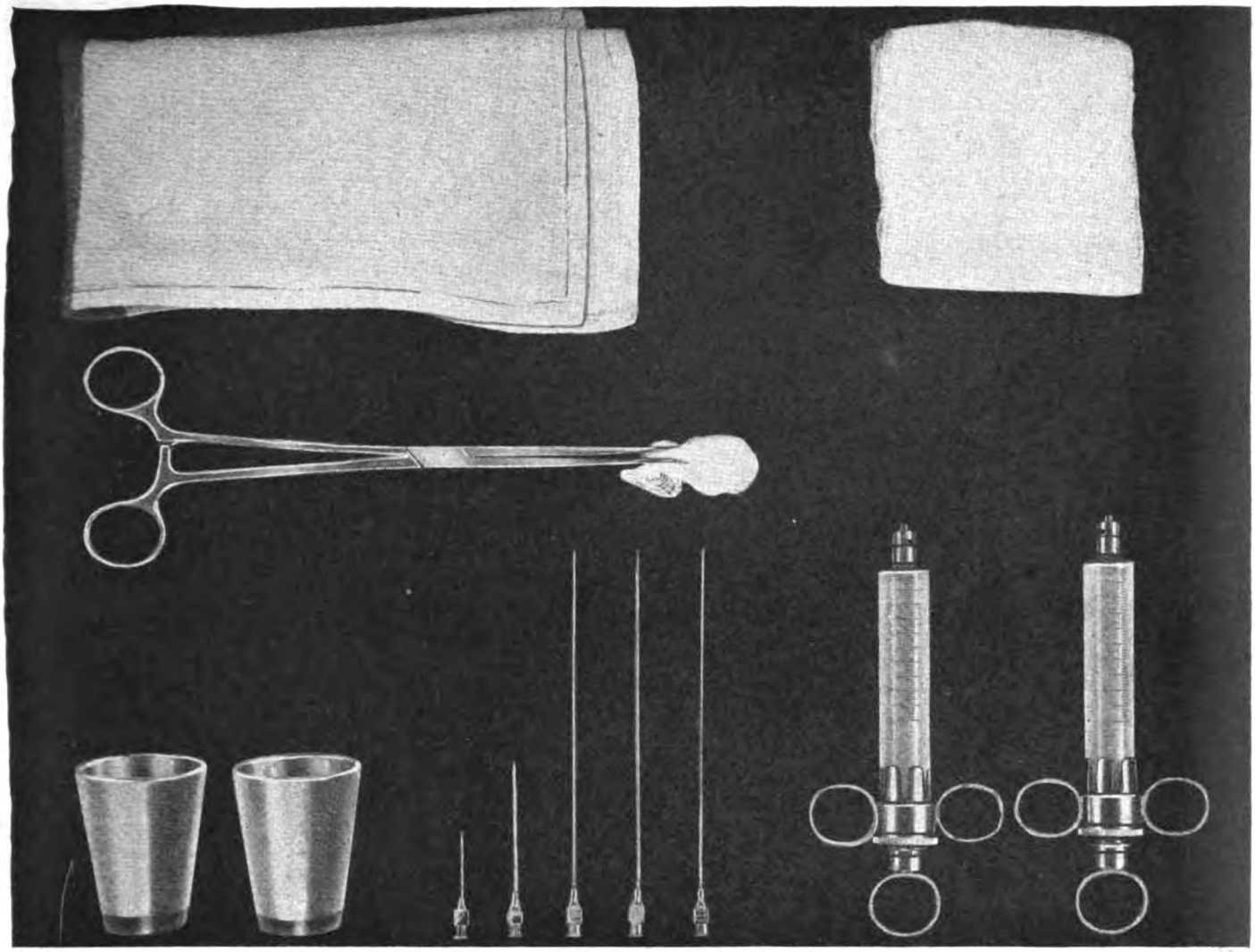
The test should be conducted in quiet surroundings.

Therapeutic effects of the drug are sedative, hypnotic, anticonvulsant and mildly analgesic.

In toxic amounts, the drug acts as a respiratory depressant.

Idiosyncrasies to the drug result in restlessness and excitement.

Withhold the last dose and notify the doctor if any untoward signs and symptoms are evident.



SYMPATHETIC NERVE BLOCK TRAY

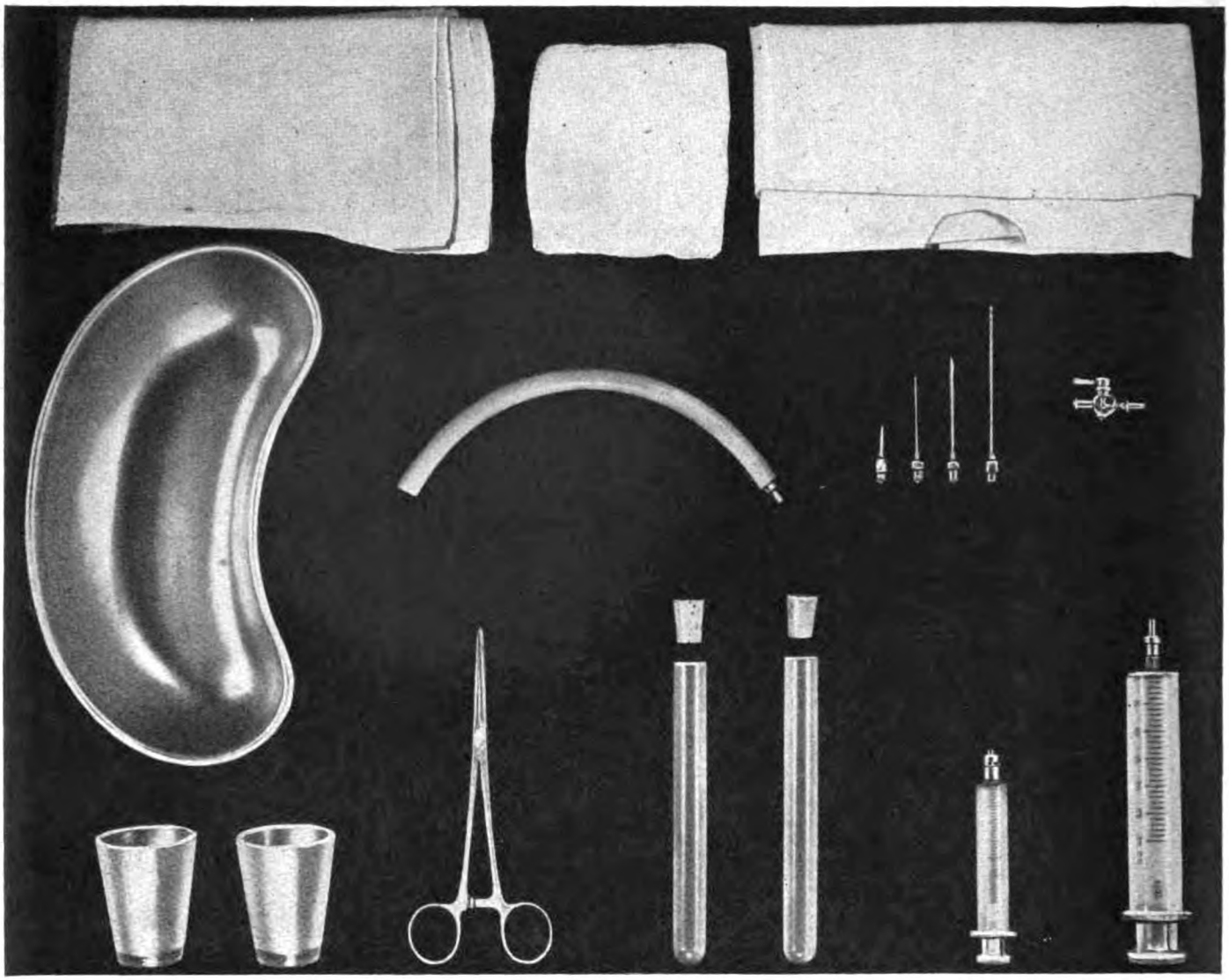
2 medicine glasses.
1 needle, hypodermic, 22 G, 1″.
1 needle, hypodermic, 22 G, 2″.
3 needles, hypodermic, 20 G, 5″.
2 syringes, Luer-Lok, 10 cc.
1 forceps, sponge, 9″, with sponge.
4 towels.
6 sponges, gauze, 4″ x 4″.

SUPPLIED BY WARD

Skin preparation tray.
Sterile gloves.
Procaine solution, 1%.
Sodium amytal, 1 ampoule.

Care of Equipment

The articles are cleaned and replaced on the tray for return to the Centralized Matériel Section.



THORACENTESIS TRAY

2 medicine glasses.
1 forceps, Kelly, curved, 6¼″.
2 test tubes with corks.
1 syringe, Luer-Lok, 5 cc.
1 syringe, 30 cc.
1 basin, curved.
1 latex tubing, 8″ with adaptor.
1 needle, hypodermic, 26 G, ½″.
1 needle, hypodermic, 20 G, 2″.
1 needle, hypodermic, 19 G, 2″.
1 needle, hypodermic, 17 G, 3″.
1 three-way stopcock.
2 towels.
4 sponges, gauze, 4″ x 4″.
1 biopsy sheet.

SUPPLIED BY WARD

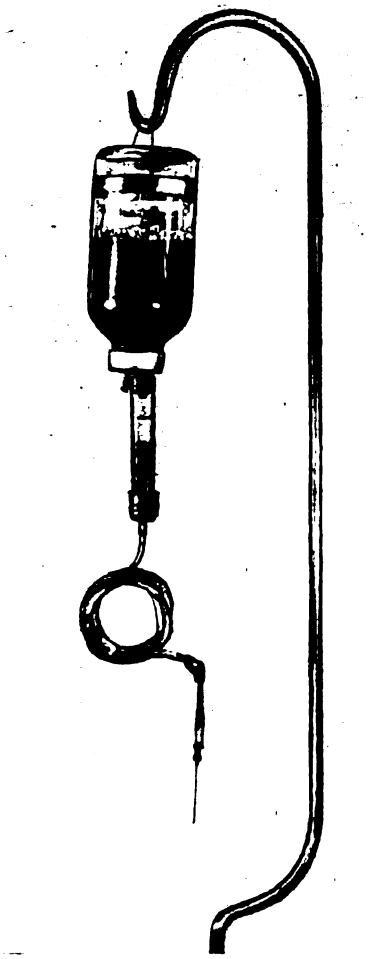
Skin preparation tray.
Procaine solution, 1%.
Safety razor and blades.
Sterile gloves.

Standard Form 514m, Miscellaneous Test, in duplicate

THORACENTESIS

Purpose: To withdraw fluid from the pleural cavity for diagnostic or therapeutic purposes.

METHOD	IMPORTANT POINTS
A. Preparation of the Patient	
1. Place in position as directed by the doctor. The patient is usually in the sitting position, leaning forward with arms resting on elevated overbed table and pillows.	Explain procedure to patient and instruct him to avoid any movement during treatment.
2. Expose chest on affected side. Shave area if necessary.	
B. Procedure	
1. Assist the doctor as needed throughout the procedure.	
2. The doctor disinfects the skin, anesthetizes the region and applies sterile drapes. He attaches the 30 cc. syringe and three-way stopcock to the needle closing the valve of the stopcock in relation to the pleural cavity. The needle is introduced into the pleural cavity, the valve opened and fluid is withdrawn. To empty the syringe, the valve is turned so that the fluid will drain through the side arm of the stopcock or the syringe is disconnected, first closing the valve.	Watch patient's color, pulse and respiration.
3. Specimens of fluid are collected directly into the test tubes.	Have stimulant tray available for emergency use.
4. Apply sterile dressing when needle is withdrawn.	
5. Make patient warm and comfortable after treatment.	
6. Record procedure, by whom done, amount and character of fluid withdrawn and patient's condition.	
C. Care of Equipment	
1. Wash articles and boil for 10 minutes.	
2. Replace equipment on tray and wrap for return to Centralized Matériel Section.	



Blood Transfusion Set Assembled

BLOOD TRANSFUSION SET EQUIPMENT

Sterile transfusion set (disposable type):
- Plastic tubing.
- Filter unit.
- Clamp.

2 needles, 18 G, 2″.

Supplied by Ward
- Skin preparation tray.
- Tourniquet.
- Arm board.
- Rubber sheet and towel.
- Standard.
- Bottle of blood.

Preparation of the Transfusion Set

1. Invert and right the bottle of blood 10 or 12 times before attaching tubing set.
2. Remove protective coverings from the bottle and the filter unit. Insert a needle into the smaller hole (air vent) in the bottle stopper.
3. Insert tip of filter unit into the larger hole in the stopper.
4. Close control clamp on tubing and suspend bottle on standard.
5. Remove protector from needle adaptor on tubing and attach the intravenous needle. Allow needle to remain in constriction tube until ready to use.
6. Open control clamp and allow blood to fill tubing to clamp only. Remove air bubbles by milking the tubing.
7. Grasp the rubber sleeve on lower end of the filter device with one hand, and with the other hand grasping the smaller rubber tip establish a pumping action by gently pulling down then releasing the tip. Continue until the blood level covers the filter. Blood should never completely fill the drip bulb.
   Tap the filter several times to dispel any air trapped inside the filter.
8. Open the control clamp and slowly fill the remainder of the set.

BLOOD TRANSFUSION

Purpose: To replace blood lost through hemorrhage, to provide blood in certain types of disease, to help relieve shock, or to give passive immunity.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. A Blood Transfusion, Standard Form 518, in duplicate is submitted for each unit (500 cc.) of blood requested. This form should be typewritten and must contain the doctor's signature. A specimen of the patient's blood must accompany the request slip.	

2. For routine transfusions, the request should be sent to the laboratory the day before the transfusion is planned.
   Requests for blood to be sent to the operating room should be submitted by 1500 hours on the preceding day.
3. The ward will be notified when the blood may be obtained. Standard Form 518 is returned with the blood to the requesting agency. After the transfusion is performed, this form is completed and one copy is returned to the Transfusion Issue Room and one copy is filed in the patient's clinical record.
4. When blood is to be administered only one unit of blood is issued at one time. The remaining units which have been requested are called for at the Transfusion Issue Room when they are to be used.

   In emergency cases more than one unit of blood may be obtained at one time.
5. If a transfusion is canceled return blood to Transfusion Issue Room at once. The seal on the transfusion bottle should not be broken until the transfusion is ready to be given.
6. The doctor is required to observe the patient for reactions for 15 minutes after the transfusion has been started.

B. Procedure

1. The information on Standard Form 518 must be checked with the information on the bottle, by both the doctor and the nurse immediately before the transfusion is begun.

   Settled cells in blood must be uniformly resuspended before blood is administered.
2. Prepare the patient in same manner as for an intravenous infusion.
3. The needle is inserted and the initial flow regulated by the doctor.

   Eighty drops per minute will deliver approximately 500 cc. in 1 hour.
4. Take the patient's temperature, pulse and respirations at the beginning and upon the completion of the transfusion. Record on the transfusion record.
5. When the transfusion is finished the doctor completes the information on Standard Form 518.
   Attach one copy to the patient's record, return the other to the laboratory.
6. Record in nurses' notes: Time transfusion was started and completed, amount given, by whom administered and patient's reaction.

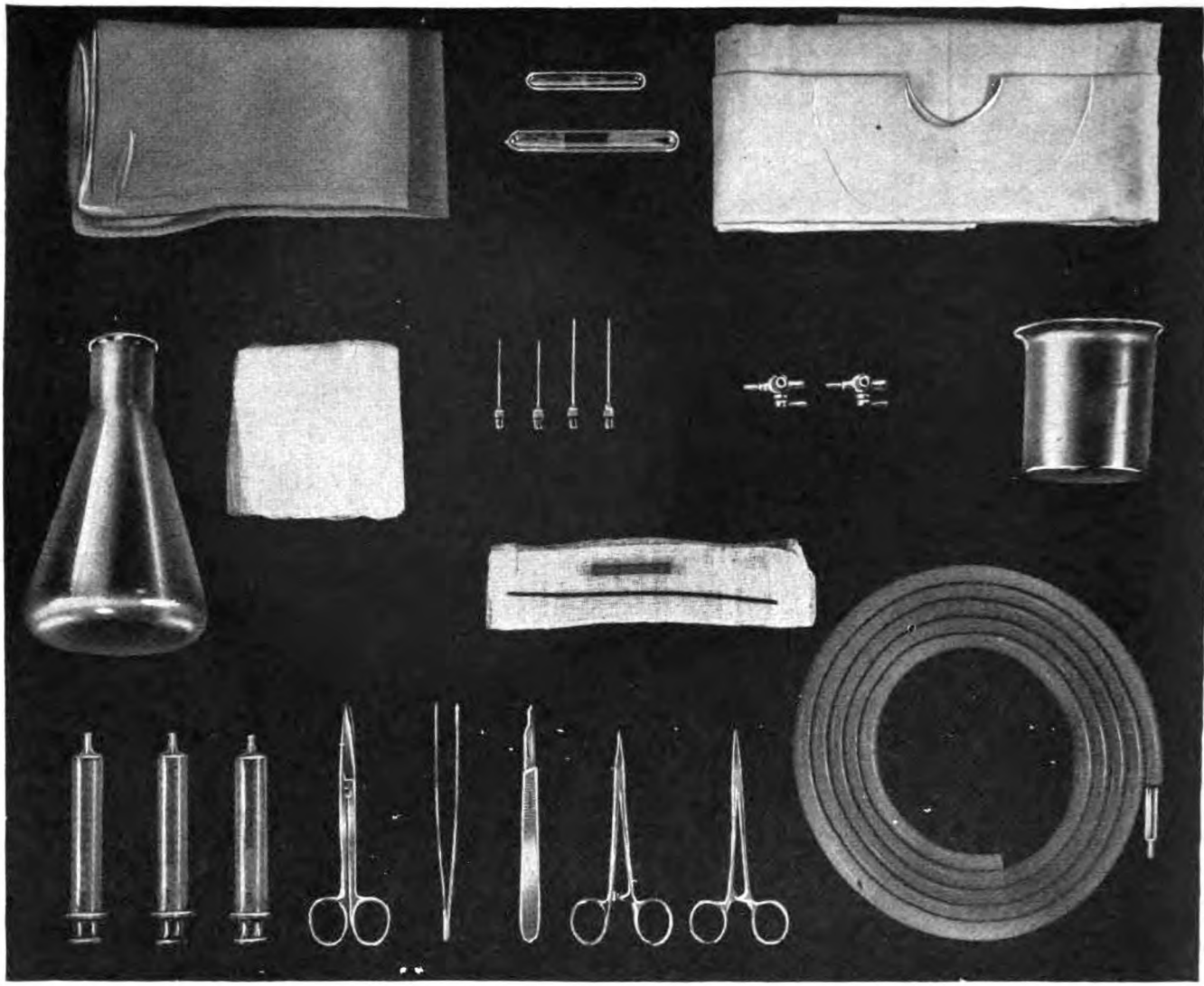
C. Procedure if Reaction to Transfusion Occurs

1. Discontinue transfusion immediately.
2. Notify the ward doctor and the laboratory officer.
3. Save all blood remaining in bottle and send to laboratory for rechecking the typing and cross-match.
4. Ten cc. of blood should be drawn from patient at once and sent to laboratory for determination of hemoglobinemia.
5. Four hours later 10 cc. of blood are withdrawn for determination of icterus index.
6. Save the first two urines voided subsequent to the reaction and forward to the laboratory. Mark Standard Form 514a "Attention: Transfusion Section."
7. Observe patient for evidence of hemolytic reaction, chill, fever, back pain, abdominal distress, substernal oppression and dyspnea, urticaria or asthma.

   Careful observation of these will help to differentiate between hemolytic reactions from pyrogenic and other reactions and may make it possible to determine the cause of the hemolysis.

D. Care of Equipment

1. Wash articles and return to Centralized Matériel Section.
2. Transfusion bottles and tubing (disposable type) are discarded.



EXCHANGE TRANSFUSION TRAY

3 syringes, 10 cc.
1 scissors, suture.
1 forceps, tissue, smooth.
1 knife handle No. 3, with No. 15 blade.
2 forceps, Kelly, curved, 5½″.
2 forceps, Mosquito, 5″.
1 rubber tubing, 4′ with adaptor.
1 flask, graduated, oblong, 500 cc.
6 sponges, gauze, 4″ x 4″.
2 needles, hypodermic, 20 G, 2″.
2 needles, hypodermic, 18 G, 2″.
2 three-way stopcocks.
1 ureteral catheter, 8″, size 12.
1 adaptor, catheter, rubber.
1 beaker, glass, 200 cc.
2 towels.
1 tape umbilical, tube.
1 suture, black silk, tube, 4–0.
1 biopsy sheet.

SUPPLIED BY WARD

Blood, type O, Rh negative, female, 500 cc.
Heparin, 3 cc.
1 ampoule calcium gluconate, 10 cc.
Sterile gloves.
Oxygen tank with hood and regulator.
2 hot water bottles.
Standard.
Skin preparation tray.
Suction machine and catheter.
Restraints.
Blood recipient set.
Normal saline solution.

EXCHANGE TRANSFUSION

Purpose: To exchange with RH negative blood, the entire supply of blood in an infant with erythroblastosis fetalis.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. Blood Transfusion, Standard Form 518, is prepared in duplicate, signed by the doctor and forwarded to the Transfusion Issue Room with a specimen of blood for cross-match and typing.	Duplicate forms are required for each 500 cc. of blood.
2. The Transfusion Issue Room will notify the ward when the blood is ready.	Type O, Rh negative female blood is always used.
3. The forms attached to the bottle of blood are completed by the doctor upon completion of the transfusion. One is attached to the clinical record and the other is returned to the Transfusion Issue Room.	
B. Preparation of the Infant	
1. Immobilize the infant with the umbilical cord exposed.	Apply restraints to keep the infant sufficiently quiet but not too confined.
2. Place hot water bottles on each side of the infant. The infant's temperature is checked two or three times during the procedure and external heat is added as necessary.	
3. Suction pharynx if necessary.	
4. Place oxygen hood over infant's head with oxygen gauge regulated at the prescribed rate of flow.	Oxygen is given constantly during the procedure.
C. Preparation of Equipment	
1. Connect the recipient set to the donor blood bottle.	Apparatus is rinsed with dilute heparin-saline solution from time to time as there is a possibility of hypocalcemic tetany resulting from the citrate in the donor blood.
2. Expel air from tubing, tighten clamp and suspend flask from standard.	
3. Open sterile pack. Pour 100 cc. of normal saline solution in glass beaker and add 3 cc. of heparin.	
4. Remove top from ampoule of calcium gluconate so that it may be given quickly if necessary.	
D. Explanation of the Operative Procedure	
1. The procedure is performed by the doctor with the assistance of the nurse. The abdomen and umbilical cord are prepared as for a laparotomy with phisoderm and Tr. of merthiolate. Drapes are applied.	Aseptic technique is used throughout the treatment.
2. The 2 three-way stopcocks are fastened in tandem and male luer end attached to the rubber catheter adaptor.	
3. The 10 cc. syringe is attached to the female luer end and the needle adaptor of the recipient set is attached.	
4. The adaptor and tubing are attached to the side arms of the distal stopcock. The end of the tubing is inserted into the 500 cc. flask and placed on the floor to receive the exsanguinated blood.	
5. The urethral catheter is passed up the umbilical vein until blood can be freely withdrawn (usually 2–3 inches) and attached to the free end of the rubber catheter adaptor. A tight tie is placed around the cord to anchor the catheter in place.	

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6. With the stopcocks properly arranged 30–40 cc. of blood is first withdrawn and immediately replaced with 10 cc. from the donor bottle. The distal stopcock is turned to connect the syringe with the discharge tube; the proximal stopcock is turned to connect the syringe with the transfusion apparatus.
   Then, 10 cc. amounts of blood are exchanged until 500 cc. has been withdrawn and replaced with the donor blood.
7. After 250 cc. of blood has been exchanged and again at the end of the transfusion, the syringe is disconnected, the tubing cleared of blood with 2 or 3 cc. of normal saline solution and 5 cc. of calcium gluconate slowly injected.
8. After the transfusion has been completed the catheter is withdrawn; the cord is tightly tied; and a dry dressing applied.
9. Record on nurses' notes the procedure, doctor's name, amount of blood exchanged and any reactions.

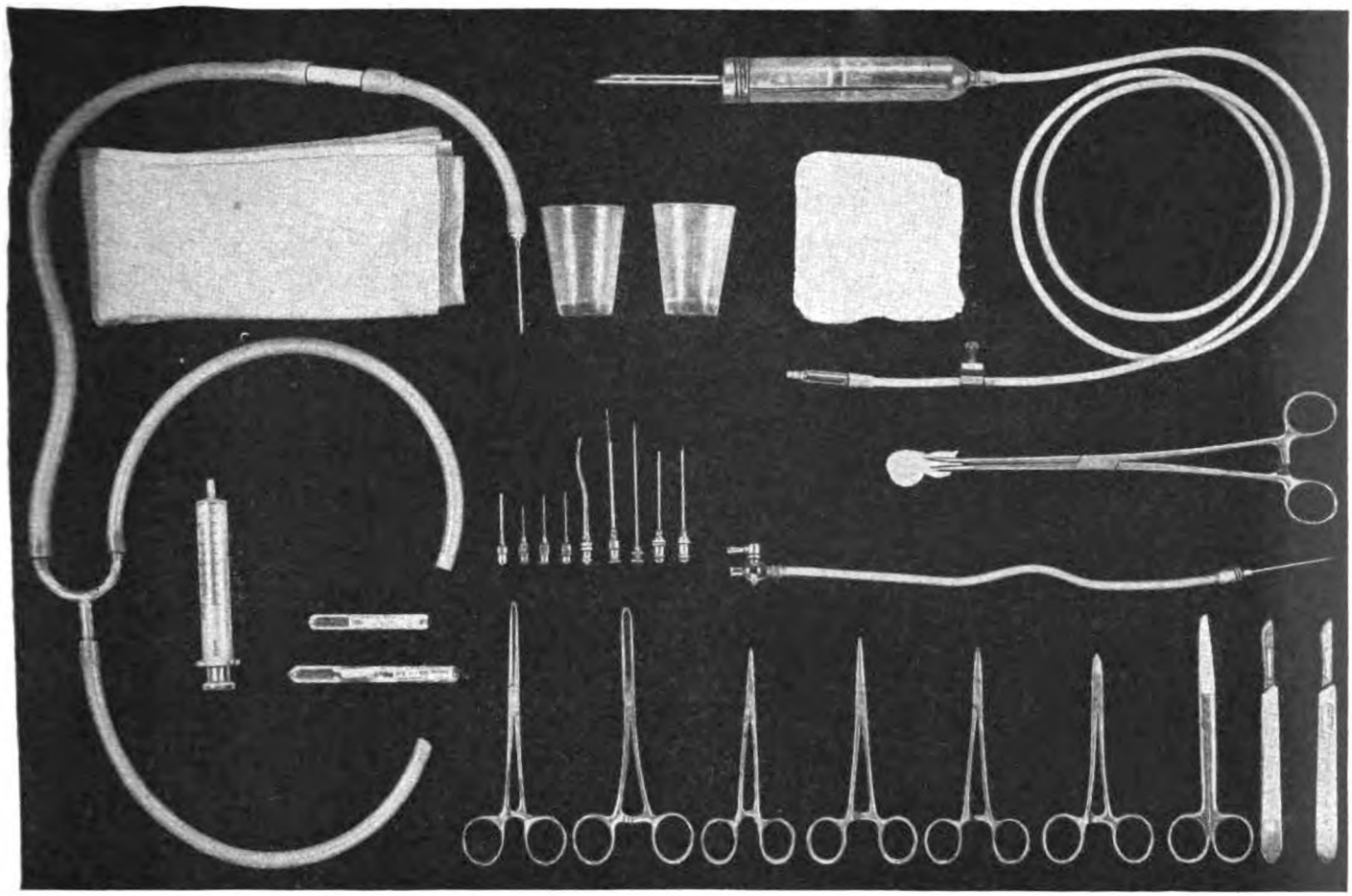
E. Care of Equipment

1. Discard transfusion bottle and disposable tubing.
2. Wash equipment with soap and water. Dry and return to Centralized Matériel Section.

The 30–40 cc. of blood first withdrawn are made up at the end of the transfusion.

Pulse rate, respirations, color and warmth of the skin are closely observed.

The entire procedure takes 2–3 hours.



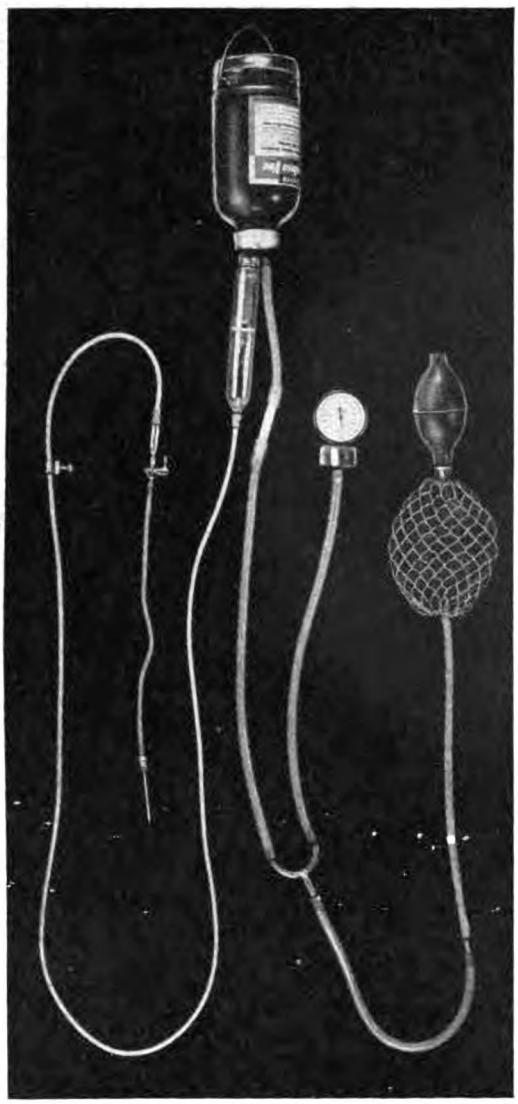
INTRA-ARTERIAL TRANSFUSION TRAY*

2 forceps, Allis.
3 forceps, mosquito.
1 needle holder.
1 scissors.
2 knives, No. 3, with No. 10 blades.
1 metal Y-tube with rubber tubing assembly.
1 syringe, 10 cc.
1 suture, black silk, 4–0 with needle.
1 suture, catgut, plain 4–0 with needle.
1 needle, blunt, 15 G.
1 needle, hypodermic, 22 G, 1½″.
2 needles, hypodermic, 23 G, 1½″.
1 cannula.
1 transfusion needle, Lindeman, 14 G.
1 needle, hypodermic, 17 G, 3″.
2 needles, hypodermic, 17 G, 2″.
1 Three-way stopcock with 17 G needle and 8″ latex tubing attached.
1 forceps, sponge, 9″, with sponge.
4 towels.
2 medicine glasses.
4 sponges, gauze 4″ x 4″.
1 blood transfusion filter with slotted strainer attached to 40″ latex tubing.

SUPPLIED BY WARD

Bottle of blood.
Skin preparation tray.
Procaine 1% and 2%.
Sterile gloves.
Standard.

*The tray and the inflation apparatus and aneriod manometer are obtained from the operating room.



Intra-arterial Transfusion Set Assembled

INTRA-ARTERIAL TRANSFUSION

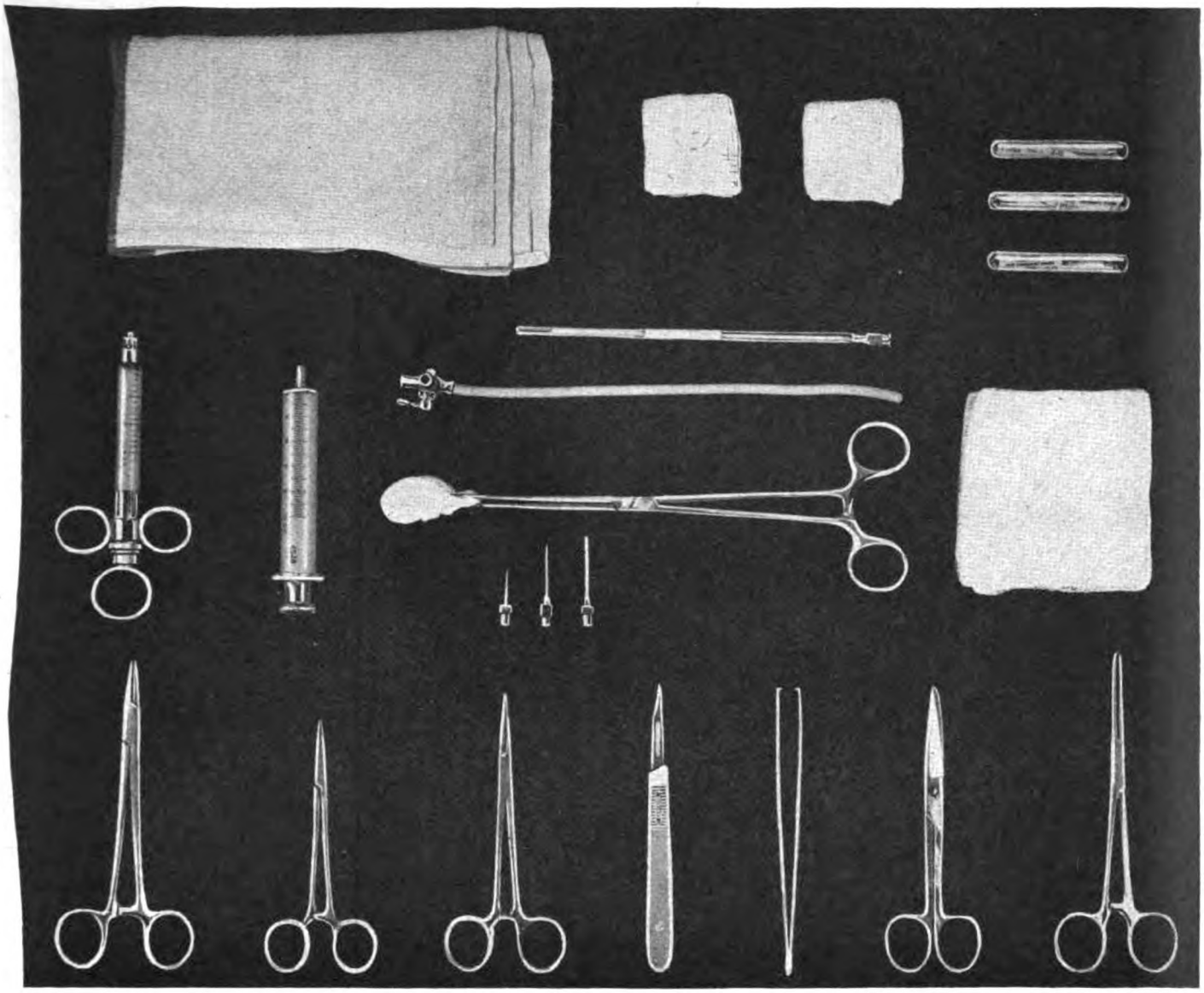
Purpose: To resuscitate in cases of profound shock by means of a rapid blood transfusion when the intravenous infusion technique would be inadequate.

A. Procedure

1. The procedure is done by the doctor the nurse assisting as needed.
2. The site for cannulation is prepared. Any large artery may be used but the femoral artery is preferable since it is accessible without performing a cut-down.
   The area is infiltrated with procaine, 1% and the needle or cannula is inserted.
3. The arterial transfusion is given either by gravity (open method) or by controlled pressure (closed method). When the gravity method is used an air-vent needle is substituted for the Y-tube assembly (see illustration). The standard is elevated to a height which will insure the flow of blood into the artery. The controlled pressure method is used when blood replacement at a more rapid rate is required. Constant and controlled pressure is exerted over the blood with the use of the air inflation apparatus and manometer.
   The arterial transfusion is continued until the patient's blood pressure is stabilized. The transfusion is then continued by vein.
   Ligation of the artery may or may not be needed. If such as the radial artery has been used, a pressure dressing may be sufficient. If percutaneous puncture is done on the femoral artery, ligation is not done.

B. Care of Equipment

1. Wash all articles and replace on tray.
2. Return tray, manometer, and inflation apparatus to the operating room.



VENESECTION TRAY

1 needle holder.
2 forceps, mosquito.
1 forceps, Kelly, 5½″.
1 knife, No. 3 with No. 11 blade.
1 forceps, tissue, mouse tooth.
1 scissors, suture.
1 forceps, Allis.
1 syringe, Luer-Lok, 3 cc.
1 syringe, 10 cc.
1 needle, hypodermic, 25 G, ½″.
1 needle, hypodermic, 22 G, 1½″.
1 needle, blunt, 15 G.
1 medicine glass.
1 forceps, sponge, 9″, with sponge.
1 Three-way stopcock with 8″ rubber tubing attached to needle end.
2 towels.
1 tubing, polyethylene, 6″, with 18 G blunt needle attached.
1 suture, silk, 4–0.
2 sutures, catgut, plain 4–0.
2 needles, suture, cutting edge, 18 G.
4 sponges, gauze, 4″ x 4″.
4 sponges, gauze, 2″ x 2″.

SUPPLIED BY WARD

Skin preparation tray.
Sterile gloves.
Procaine solution, 1%.

Care of Equipment

1. Wash and dry all equipment. Replace on tray.
2. Wrap for return to Centralized Matériel Section.

Nebulizer Attached to Oxygen Regulator

AEROSOL THERAPY

Purpose: To administer volatized medication by inhalation in the treatment of respiratory infections.

A. Equipment

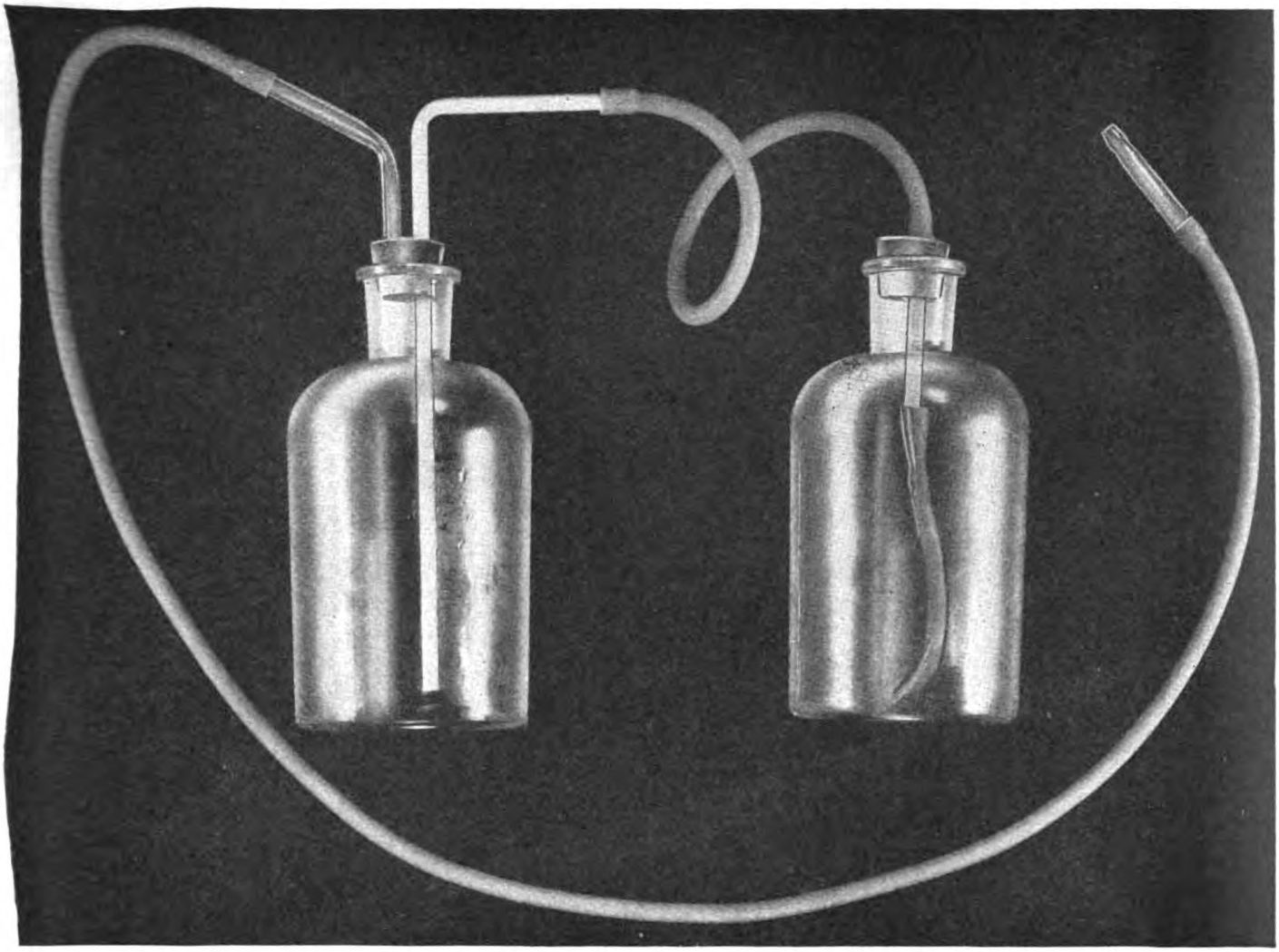
Plastic nebulizer and bulb attachment.
Rubber tubing, 3′.
Oxygen tank and gauge.
Medication as prescribed.

B. Procedure

1. If the nebulizer is used as a hand atomizer the bulb is left attached. If oxygen is used, bulb is detached and the rubber tubing is connected to the body of the nebulizer and to the regulating gauge on the oxygen tank.
2. Pour the prescribed dose of medication through the small opening in the nebulizer.
3. Remove the cork from the mouth piece of the nebulizer and have the patient insert the part into his mouth.
4. Adjust the regulating gauge to 4 liters per minute.
5. If nasal passages are treated the patient breathes through the nose, keeping the mouth closed.
   If laryngeal inhalation is required, grasp the tongue with a piece of gauze and pull it forward as far as possible. Have the patient compress his nostrils and breathe deeply.
   If the deeper air passages are involved, the patient breathes deeply, with the mouth wide open, the head somewhat extended, tongue touching the rear surface of the lower teeth, the palate raised as in yawning.
6. If the patient administers his own treatments instruct him to place a finger over the small opening in the nebulizer during inspiration and to remove finger during expiration. It usually requires 10–30 minutes to nebulize a single dose.
7. Instruct the patient to rinse his mouth during and after the treatment to avert a sore mouth and tongue.
8. Rinse the nebulizer with clear water or saline following each treatment to prevent occlusion of the fine opening by medication remaining in the parts.
9. Record medication, dose, and length of treatment.

C. Care of Equipment

1. Wash nebulizer in soap and water and soak in zephiran chloride solution 1:1000 for 10 minutes.
2. Return all equipment to Centralized Matériel Section.



BLOW BOTTLES

Purpose: To provide a means of increasing the intrathoracic pressure as an aid in re-expanding the lungs.

A. Equipment

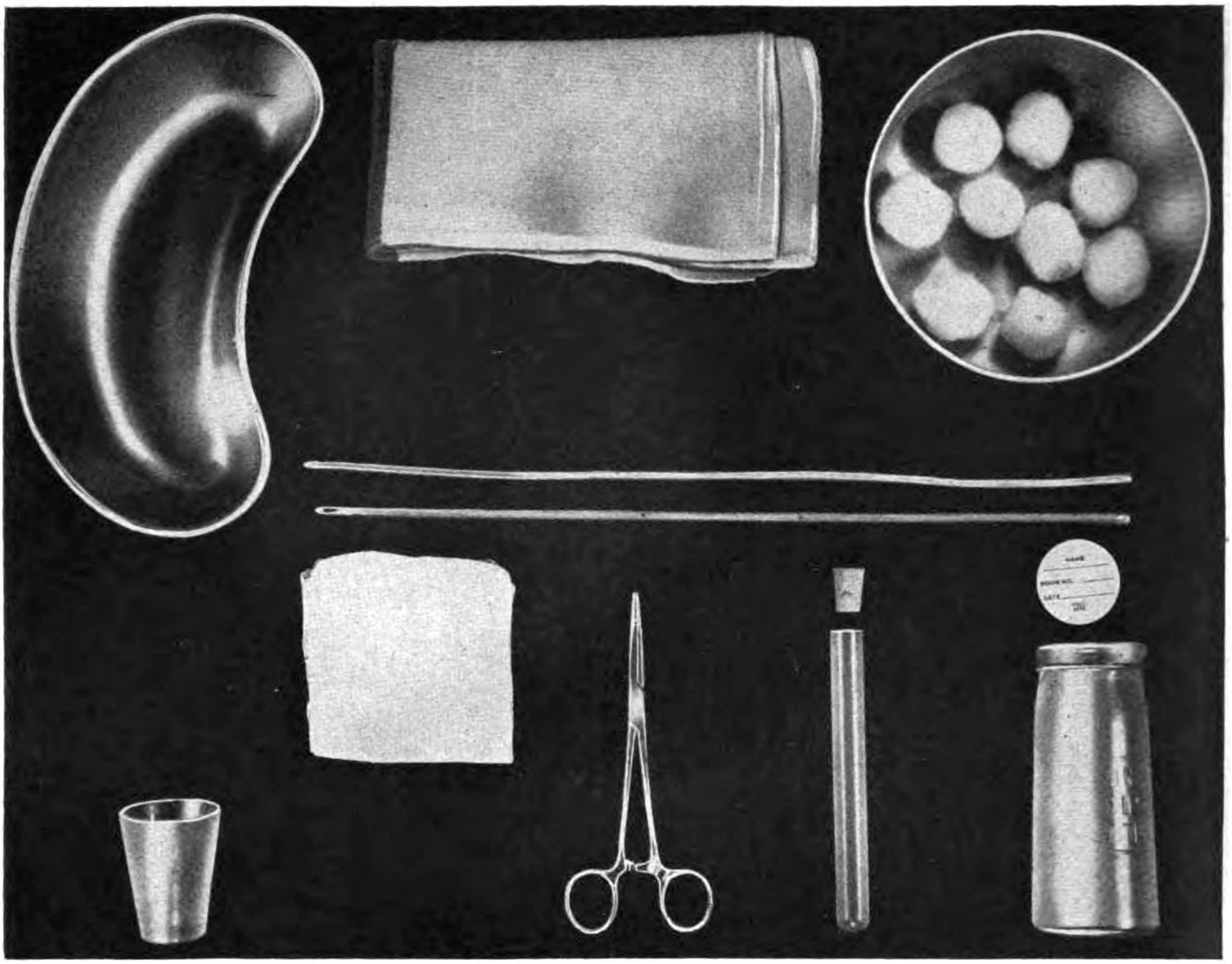
A pair of graduated quart bottles fitted with two-way rubber stoppers, glass tubes and rubber tubing in such an arrangement that by blowing through one end of the system, water may be forced from one bottle to the other (see illustration).

B. Procedure

1. Fill the bottle (with the long rubber tubing) three-quarters full of water and reinsert the stopper.
2. Instruct the patient to place the tip of the glass connector attached to the long tubing into his mouth and blow forcibly into the bottle thus causing the water in the bottle to be evacuated into the empty bottle.
3. Exchange the bottle fittings when the bottle is empty and repeat the procedure.
4. Blow bottles should be used according to the specific orders of the doctor. Inform the patients who do this treatment for themselves the length of time they should use the blow bottles at each treatment.

C. Care of Equipment

1. Wash the bottles, fittings and tubing with soap and water. Rinse well and dry.
2. Return articles to Centralized Matériel Section.



CATHETERIZATION TRAY

1 medicine glass.
1 forceps, Kelly, curved, 6¼″.
1 test tube with cork.
1 specimen bottle and cap.
1 basin, curved.
1 catheter, French, No. 16.
1 catheter, French, No. 14.
1 towel.
1 bowl, sponge.
8 cotton balls, medium.
2 sponges, gauze, 4″ x 4″.

SUPPLIED BY WARD

Zephiran chloride, 1:1000, 30 cc.
Lubricant jelly.
Rubber sheet (small) and towel.
Sterile gloves.
For instillation of medication add:
    Sterile medicine glass with medication.
    Sterile asepto syringe.

For insertion of retention catheter add:
    Sterile Foley catheter, size as ordered.
    Sterile 30 cc. syringe.
    Sterile medicine glass with 30 cc. water.
    Glass adaptor.
    Adhesive tape and rubber band.
    Gravity drainage bottle and tubing.

Standard Form 514a, Urinalysis, in duplicate
Standard Form 514m, Miscellaneous Test, in duplicate, for smears, cultures, etc.

CATHETERIZATION OF URINARY BLADDER

Purpose: To remove urine from the bladder for relief of distention, for determination of residual urine, and for examination.

METHOD	IMPORTANT POINTS
A. Procedure for Catheterization of Female Patient	
1. Prepare equipment. Pour 30 cc. zephiran solution over cotton balls in sponge bowl. Expel small amount of lubricant over catheter tip.	Use aseptic technique throughout procedure.
2. Drape patient. Place rubber protector under hips. Adjust light. Place tray on foot of bed and uncover.	Explain treatment to patient.
3. Put on sterile gloves. Arrange sterile towel under patient's hips.	Secure assistant if patient is unconscious or unduly restless.
4. Separate labia and cleanse vestibule with moistened cotton balls. Wipe with downward stroke. Repeat three times. Discard into paper bag.	
5. Grasp catheter about 3 inches from tip and insert gently about 2 inches, or until urine starts to flow. Collect urine in curved basin.	
6. Collect specimens directly in urine bottle; urine for culture is collected in sterile test tube.	
7. Pinch catheter and withdraw gently.	
8. Record in nurses' notes, time, treatment, amount of urine, specimen sent to laboratory.	
B. Procedure for Catheterization of Male Patient	
(The procedure is done by doctor or male nurse. The nurse in charge of the patient sets up the tray.)	
1. Place a sterile towel beneath penis and above scrotum and across upper thighs. Lay another towel across lower abdomen.	
2. Place curved basin beneath the penis.	
3. Cleanse penis and prepuce with cotton balls moistened in zephiran solution.	
4. Select the proper catheter, grasp it about 2 inches from tip and lubricate.	
5. Hold the penis directly behind the glans with thumb and forefinger of left hand. Insert catheter slowly and gently, maintain gentle traction on penis as catheter is passed into urethra. Collect specimen as ordered.	
6. Pinch catheter and withdraw gently.	
C. Instillation of Medication	
1. When urine ceases to flow, attach the barrel of the asepto syringe to the end of the catheter. Pour in medication, allowing it to run in slowly.	
2. Pinch catheter and withdraw gently.	
D. Insertion of Retention Catheter	
1. Insert retention catheter.	
2. When urine ceases to flow, inflate the balloon with water through the smaller of the two openings on catheter. Close lumen of tube with rubber band.	
3. Connect catheter to gravity drainage apparatus. Anchor catheter to patient's thigh with adhesive.	
E. Care of Equipment	
1. Wash articles with soap and water.	
2. Replace equipment on tray and wrap for return to Centralized Matériel Section.	

COLOSTOMY DRESSING

Purpose: To keep the patient clean and free from odor and to prevent irritation of the skin around the colostomy.

METHOD	IMPORTANT POINTS
A. Equipment	
Individual dressing tray (kept at the bedside): Can of fluff gauze. Can of cotton balls in white soap solution. Container of applicators and tongue blades. Abdominal pads. Forceps in zephiran solution, 1:1000. Ointment as prescribed. Large paper bags or newspapers. Montgomery straps.	
B. Procedure	
1. Remove soiled dressings and place in paper bag or newspaper.	Unsoiled dressings should be saved and reused.
2. Wash gently the area around the colostomy with soapy cotton balls. Remove all traces of soap with fluff and clear water. Dry thoroughly.	
3. Apply vaseline gauze (or prescribed ointment) around the colostomy.	
4. Cover the stoma with gauze fluffs. Apply abdominal pad and hold dressing in place with Montgomery straps.	Use a binder to secure the dressings if the patient's skin shows any allergy to the adhesive straps.
5. Cleanse tray, replenish supplies and return to the unit.	

COLOSTOMY IRRIGATION

Purpose: To cleanse the intestinal tract, to prevent intestinal obstruction and to establish regularity of evacuation.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. Information relative to the nature of the surgery performed should be obtained from the doctor. Specific information should be given as to whether there are both a proximal and distal loop and whether both are to be irrigated.	
2. The irrigation should be given at the same time each day in order to help establish regular habits of evacuation.	
B. Equipment	
Enema tray with catheter, No. 16 or 18. Pitcher of irrigating solution 105°–108° F., as ordered. Colostomy dressing tray. 2 bedpans or 2 basins, curved. Rubber sheet and towel. Gloves. Binder Standard.	
C. Procedure	
1. Hang the irrigating can about 18 inches above the colostomy stoma.	The patient should be encouraged to watch the procedure as performed by the nurse.
2. Protect the bed with the small rubber sheet.	
3. Remove dressings and cleanse the skin.	
4. To irrigate the proximal loop: Place a curved basin or bedpan at the side of the patient for the return flow.	
Insert the lubricated catheter gently into the abdominal opening about 4–6 inches with the solution running. Use a curved basin to direct the return flow.	If fluid is running when the catheter is introduced it distends the colon and permits advancement of the tube with more ease and safety.
If the catheter is very small, the irrigating solution may be introduced by gravity through an asepto syringe with the bulb removed. Clamp the catheter while pouring the solution into the syringe.	
If the solution does not begin to return after about 500 cc. has entered the bowel, clamp off the tubing and allow the feces to evacuate. Continue to irrigate until the return flow is clear.	The quantity of fluid used will vary depending on the location of the colostomy.
5. To irrigate the distal loop: Place the patient on the bedpan and insert rectal tube into the distal loop about 4 inches and proceed as above.	
If the solution is not expelled through the rectum or if the patient complains of severe cramping withdraw the tube and allow solution to return through the colostomy opening.	Should there be an obstruction the solution may be removed by siphonage.
6. Cleanse the skin with soap and water when the irrigation has been completed. Reapply dressings.	

E. Patient Education

The patient should be independent and self-sufficient in the care of his colostomy when he leaves the hospital.

1. Establishing regularity by irrigation:

   If the colostomy is permanent the patient should be taught to irrigate his colostomy before discharge from the hospital. Begin by allowing the patient to introduce the tube into the colostomy opening when the irrigation is given.

   The irrigation should always be given at the same time to aid in establishing regularity of evacuation. The time selected should be that which will be most convenient for the patient when he returns to his normal activities.

   The patient may either stand, lie on his side or sit on the toilet when giving himself the irrigation.

   How often the colostomy needs to be irrigated is an individual matter and varies from every day to 2 or 3 days.

   Discourage the wearing of collection bags. Regardless of how well they are cleaned they usually retain a fecal odor. Moreover, if patients become dependent upon such appliances, control through irrigation and proper diet may be delayed or may never be established.

   When the bowel movements have become regular, a small gauze or cloth dressing (covered with oiled silk if it makes the patient feel more secure) held in place with elastic belt or two-way stretch, soft girdle is sufficient.

   Equipment needed at home will be an enema can, rubber tubing, a rectal tube and a basin.

2. Establishing regularity by diet:

   Advise the patient to eat a balanced diet with only a moderate amount of roughage and to avoid those foods which give him diarrhea.

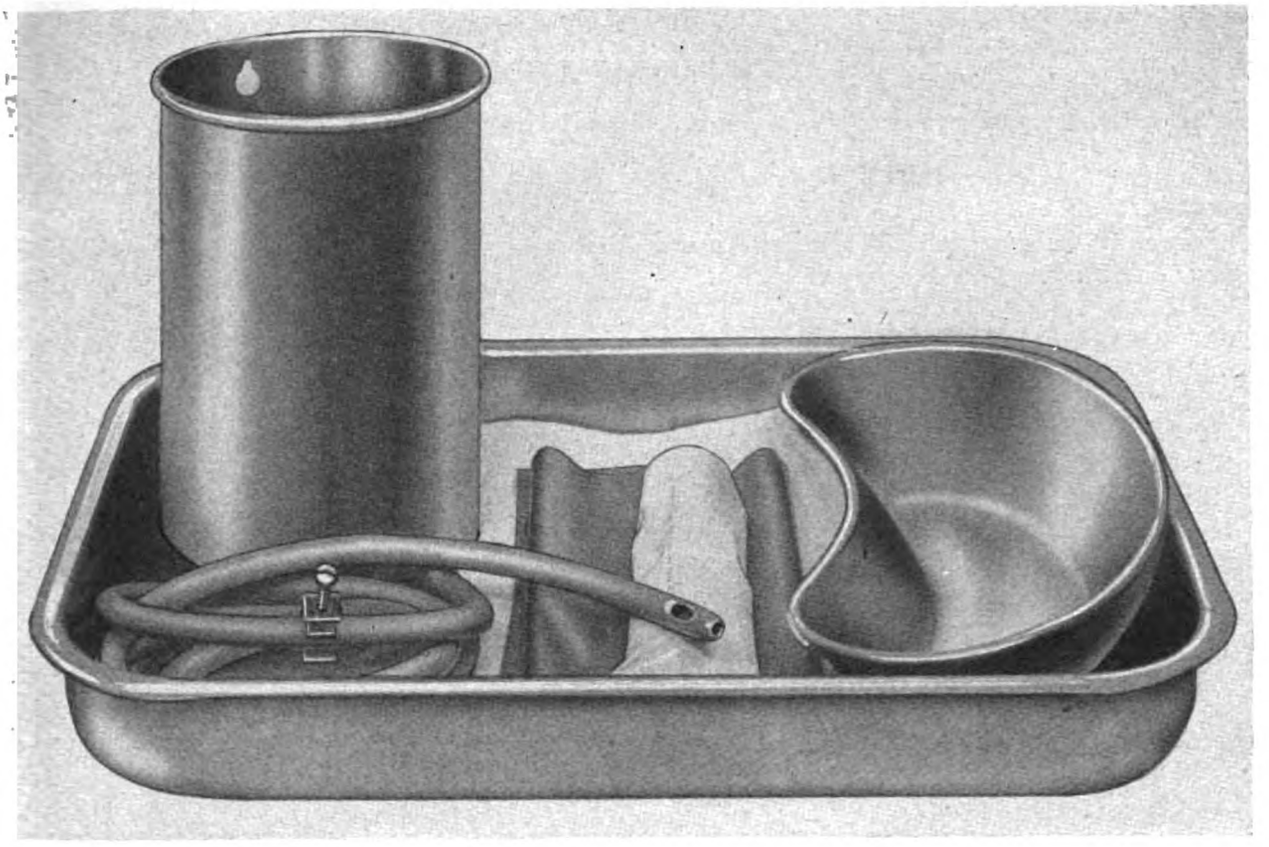
3. Care of the skin:

   Instruct the patient to wash the skin daily or more frequently if necessary with soap and water and to dry it thoroughly. Talcum power may be applied.

   Aluminum paste or zinc oxide with castor oil will relieve irritation of the skin. If pastes or ointments are used they should be removed daily with mineral oil before they are reapplied.

4. Encourage the patient to continue his former way of living. Let him know that many people with colostomies return to work and resume their social activities.

5. Tell the patient to consult his doctor if anything unusual or disturbing arises.



STANDARD ENEMA TRAY*

Tray with the following articles:
- Irrigating can.
- Rubber tubing, 3′, with glass connector and clamp.
- Rectal tubes.
- Lubricant jelly.
- Rubber sheet and cover.
- Curved basin.

Equipment for retention enema:
- Small pitcher.
- Funnel.
- Catheters, French, No. 14 and 16.

Solutions:
- Tap water.
- Normal saline.
- Sodium bicarbonate, 8 Gm. (2 tsp.) to 1,000 cc.
- Soap solutions (white soap, amount needed to make a milky solution).
- M. G. W. or 1–2–3 enema:
  - Magnesium sulphate 30 cc.
  - Glycerine 60 cc.
  - Water 90 cc.
- Temperature: 105°–110°.
- Amount: 500–1,000 cc.

*The standard enema tray will be set up and maintained by the ward.

ENEMAS

A. CLEANSING ENEMA

Purpose: To soften feces and cause an evacuation of feces and flatus.

METHOD	IMPORTANT POINTS
A. Procedure	
1. There must be a written order for an enema. Prepare equipment and bring to bedside. Screen patient.	Enemas should always be given with patient in the recumbent position.
2. Turn patient on left side with right knee flexed over left. Place rubber sheet and cover under patient's hips.	
3. Hang irrigating can on standard about 18″ above the patient's hips.	
4. Expel air from tubing and insert well-lubricated rectal tube gently about 4 inches into the rectum. Allow solution to run in slowly. Instruct patient to breathe through mouth to relieve discomfort.	If solution is given slowly a larger amount may be given without exciting the evacuation reflex.
5. Remove rectal tube and place patient on bed pan. Ambulatory patient may expel enema in commode.	
6. Record in nurses' notes: Type of solution, amount, results of enema and patient's reaction.	

B. RETENTION ENEMA

Purpose: To soothe and relieve irritation of rectum, to soften fecal contents, to administer nutrients and medications.

A. General Instructions

1. Retention enemas (except oil enemas) are usually preceded by a cleansing enema in order to rid the lower bowel of fecal matter, lessen distention and aid retention. At least an hour should elapse before retention enema is given.
2. Retention enemas should be small in amount, about 100 cc., or less, but not so small that the substance dissolved is irritating to the rectal mucosa.

B. Procedure

1. Prepare prescribed solution in small pitcher, heat to body temperature by placing pitcher in pan of hot water.
2. Prepare patient as for enema procedure.
3. Insert catheter, attach funnel and pour in solution. Allow solution to run in slowly and steadily.
4. Withdraw catheter and have patient press a pad of toilet tissue against the anus for a few minutes. Patient should remain in the recumbent position for at least an hour to lessen inclination to evacuation.

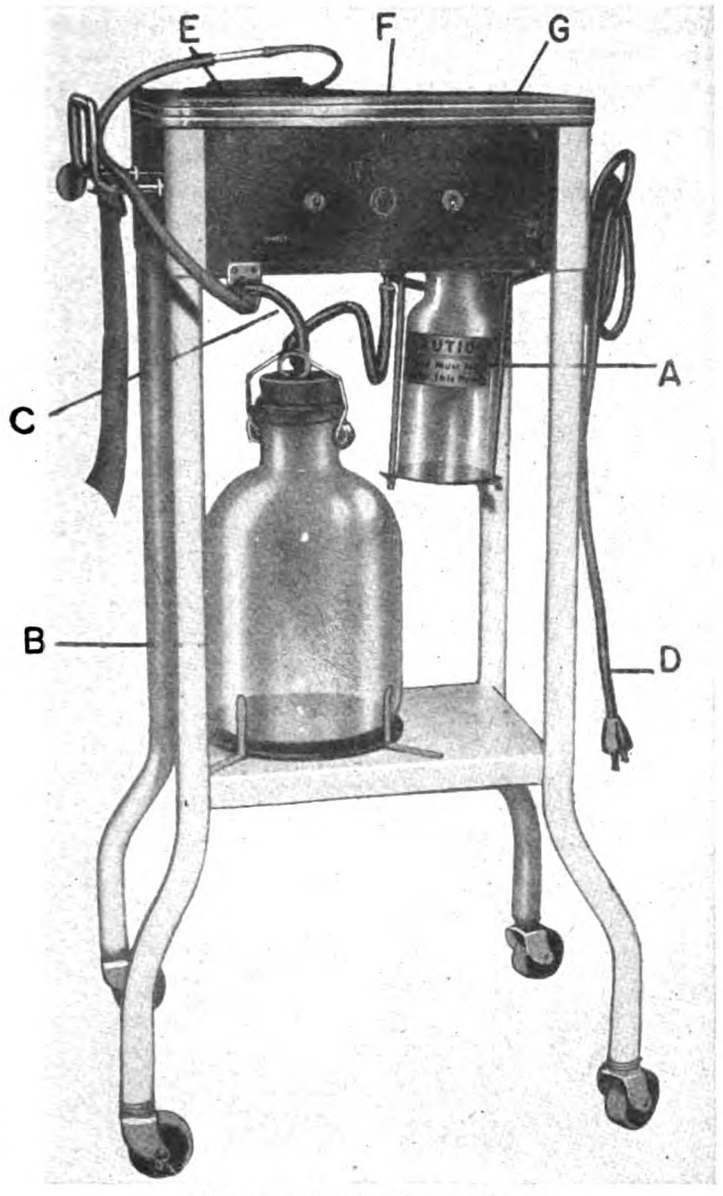
   If the patient feels he can not hold the prescribed amount of solution it is better to repeat the procedure in an hour rather than force it all at one time.

5. Record in nurses' notes: Type of solution, amount, and patient's reaction.

C. Care of Equipment

Flush rectal tube with cold water. Wash equipment with soap and and water, sterilize in bed pan sterilizer for 10 minutes and reset tray.

ELECTRIC DRAINAGE APPARATUS



Thermotic Drainage Pump

Drainage Apparatus

A Trap bottle.
B Vacuum bottle.
C Tube on vacuum bottle.
D Electric cord.
E Thermostat switch.
F Pilot light.
G High-low switch.

A. Operation of the Drainage Apparatus

1. Explanation of the principle:

   The pump produces the vacuum which is used for suction drainage purposes. It operates on the principle that air expands when heated and contracts when cooled. Electric heating wires heat the air intermittently in an enclosed chamber. Two valves are attached to the enclosed chamber; one allows air to enter this chamber while the other allows air to leave. This interplay of the intermittent heating and cooling of the air in the enclosed chamber with the two-valve system causes a partial vacuum to be produced. When a drainage bottle is connected to the valve which allows air to enter the chamber, a partial vacuum is produced in the bottle.

   The degree of suction is accurately controlled by the mechanism; the degree of suction can be set for a minimum of 90 mm. or a maximum of 120 mm. of mercury.
2. Plug cord into electric wall socket.
3. Connect tubing C to the drainage tube (catheter, duodenal tube, etc.)
4. Turn on switch G. Switch is always set at 90 mm. unless ordered otherwise.
5. Turn on E. After the unit has been in operation for about 5 minutes air in the vacuum bottle and trap bottle will be exhausted and drainage will start.

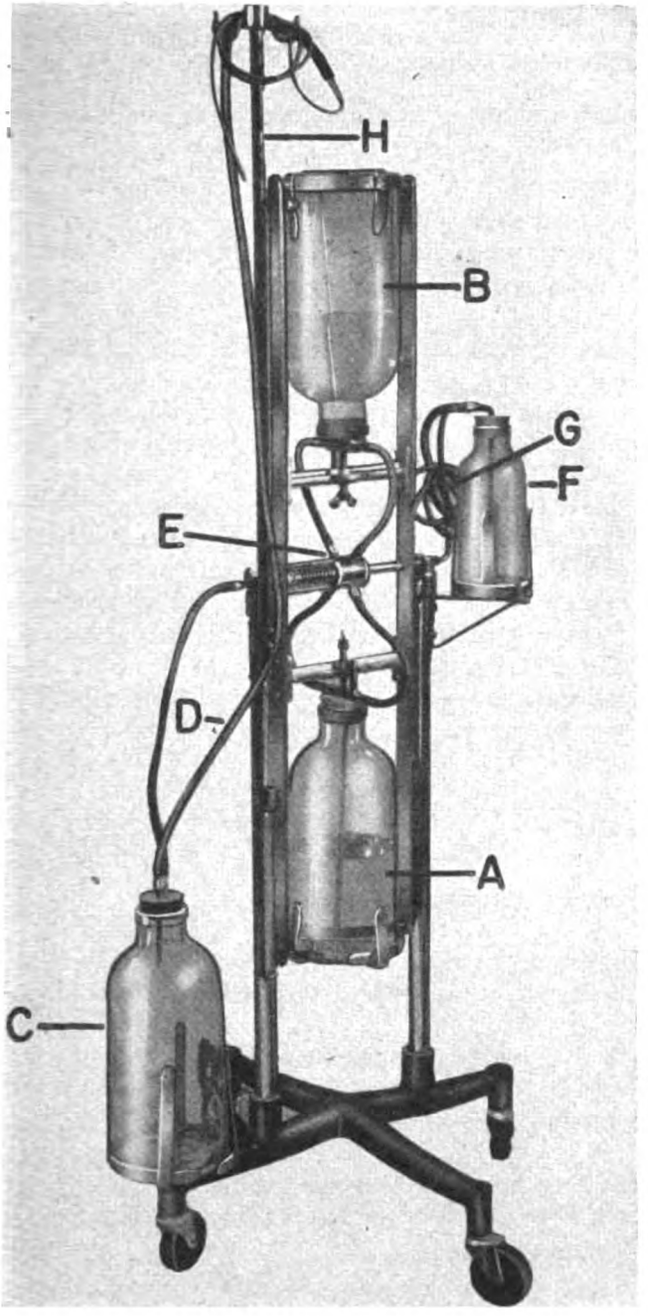
6. Empty bottle B before the level of the contents in the bottle reaches the "danger" line marking on the bottle.

   Any fluid getting into the trap bottle and hence to the valves will ruin the valves and may burn out the heating element. If fluid should be carried into the trap bottle, disconnect it from the apparatus and clean and dry the metal connections and rubber cap. Wash and thoroughly dry the trap bottle before connecting it to the apparatus.

B. Care of Equipment at End of Treatment

Empty bottle and wash with soap and water. Return complete apparatus to Centralized Matériel Section.

AUTOMATIC DRAINAGE AND IRRIGATING APPARATUS



Drainage Apparatus

A and B Water bottles.
C Drainage bottle.
D Drainage tubing.
E Rotary valve which controls flow of water, suction and pressure.
F Irrigation bottle.
G Tubing on irrigation bottle.
H Adjustable rod.

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GASTRIC AND DUODENAL SUCTION

Mechanical Drainage Apparatus

(*Wangensteen Method of Suction Drainage*)

Purpose: To provide continuous suction drainage of the stomach and upper intestinal tract by means of a vacuum which is produced by the flow of water from a higher level to a lower level in a closed system.

A. Procedure when Apparatus is Used for Suction Drainage

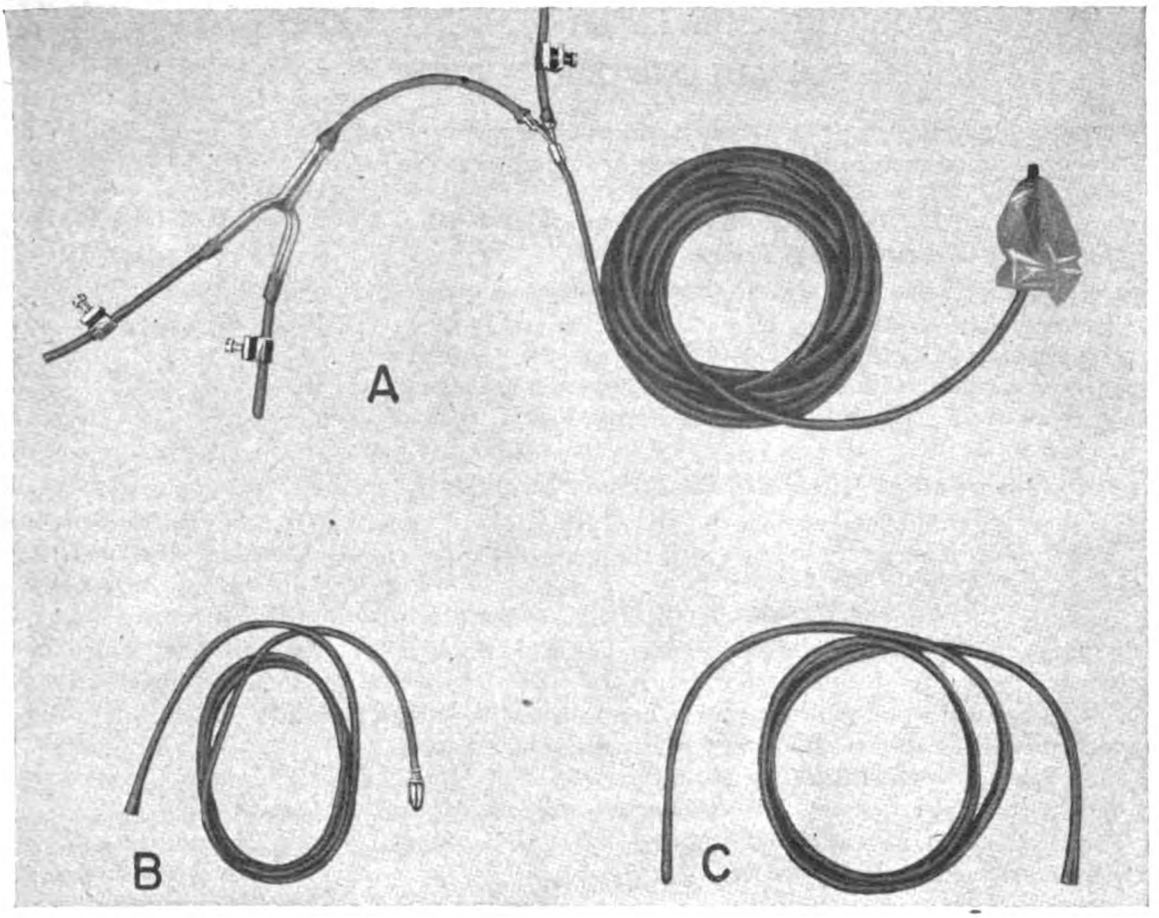
1. Fill bottle A to top with tap water. In bottle C place about a one inch layer of water.
2. Attach drainage tubing D to glass connector on the gastric tube which has previously been inserted into the patient. (See procedure on *Gastric and Intestinal Intubation* for insertion of gastric tubes.) Temporarily clamp off the gastric tube.
3. Release spring lock on the apparatus by exerting slight pressure on the metal frame. Rotate the frame so that the positions of bottles A and B are interchanged.
4. Test the apparatus for leaks. Check all bottle fittings and tubing attachments to ensure the entire system is airtight. If the water level in the upper bottle continues to fall after the first few seconds, this indicates that there is an air leak in the apparatus.
5. Loosen clamp on gastric tube to initiate drainage. Check bottle C for entrance of drainage.
   Water falls from bottle B to bottle A through valve E. A partial vacuum is thus created in bottle B and in drainage bottle C. The vacuum in C is transmitted along tubing D to the gastric tube and the stomach contents thereby drain into C. In any vacuum system, a gas or liquid flows from the region of greater pressure (such as the stomach) to a region of lower pressure (such as in bottle C). When the vacuum in bottle B no longer exists, suction action and drainage from the stomach ceases.
6. When the upper bottle becomes empty, rotate the frame and interchange the positions of the bottles. This produces the vacuum again. Do not clamp tubing when interchanging the bottles; the interflow of water is controlled by the rotary valve E. The valve automatically shuts off when the bottles are not in the vertical position.
7. Empty bottle C as necessary, and at least once daily.

B. Procedure When Apparatus is Used for Irrigation

1. The apparatus can also be used to produce positive pressure for irrigation.
2. Fill bottle F with water or normal saline.
3. Connect tubing G to the glass connector on the gastric tube. Interchange the position of the water bottles so that the full bottle B is uppermost. The water in the irrigating bottle F then flows through tubing G into the gastric tube.
   The upper bottle B is used for vacuum; the lower bottle A is used to produce the pressure required by bottle F for irrigation. Valve E permits the pressure produced in A to be transmitted to bottle F and the water is forced out of F. When the apparatus is used to produce pressure for irrigation, tubing D and bottle C must be left open to the atmosphere.
4. When the prescribed amount of irrigating solution has been introduced, detach tubing G from the gastric tube. Connect the gastric tube to the drainage tubing D to establish suction for the removal of the irrigating solution.

C. Care of Apparatus at End of Treatment

1. Empty drainage bottle. Wash with soap and water. Remove water from other bottles.
2. Replace clean bottles in proper holders. Return the complete apparatus to Centralized Matériel Section.



GASTRO-DUODENAL DRAINAGE TUBES

A Miller-Abbott tube*
B Rehfuss tube
C Levin tube

SUPPLIED BY WARD

Basin of cracked ice.
Basin of water.
Syringe, 50 cc.
Adhesive tape.
Lubricating jelly.
Curved basin.
Towel and rubber sheet.
Tissue wipes.
Suction apparatus as ordered.

*Miller-Abbott tube and attachments:
3″ tubing and clamps on base of glass-Y, attached to "suction" side of metal Y on M. A. tube.
3″ tubing and clamp on arm of glass-Y (to be connected to tubing leading to suction apparatus).
2″ tubing and clamp on other arm of glass-Y (to attach syringe when irrigating M. A. tube).
2″ tubing and clamp, attached to "inflation" side of metal Y on M. A. tube.

GASTRIC AND INTESTINAL INTUBATION

MILLER-ABBOTT TUBE

Purpose: To remove fluids and gas from stomach and small bowel in persistent vomiting or intestinal obstruction, in preparation for gastro-intestinal surgery or in postoperative care.

METHOD	IMPORTANT POINTS
A. Preparation of the Miller-Abbott Tube	
1. Prepare a glass Y-tube assembly if this attachment is ordered (see illustration).	
2. Examine the balloon on Miller-Abbott tube for defects Attach a syringe to the inflation lumen, inject air and test for leakage.	
3. Withdraw air from balloon and place coiled tubing in basin of cracked ice.	
B. Procedure for Insertion of Miller-Abbott Tube	
1. Show patient the tubing and explain the procedure.	If the patient has removable dentures, these should be taken out before the tube is passed.
2. The procedure is done by the doctor with the nurse assisting as needed.	
3. The tip of the tube, with balloon folded umbrellalike, is lubricated with a small amount of water-soluble lubricant and passed through the patient's nose.	Oils and hydrocarbons are destructive to balloon and tubing.
4. The patient is given water to drink, and as he swallows, the tube is advanced until the 45 cm. mark reaches tip of the nose.	
5. The glass Y-tube assembly is connected to the metal Y on M. A. tube on the side marked "suction." One arm of the glass Y is then connected to the suction apparatus. Suction is established and maintained constantly thereafter.	Tube should have reached the stomach. See procedures for operation of Wangensteen suction and electric suction apparatus.
6. The patient is turned on his right side and the tube is advanced 1 inch every 15 minutes until the 75 cm. mark reaches the patient's nose.	This position facilitates the passage of the tube into the duodenum.
7. To test the location of the tube the doctor draws 10cc. of air into a smoothly working syringe and injects the air into the lumen leading to the balloon (inflation side of metal Y). If the tube is in the duodenum the syringe barrel will be pushed back by the irregular peristaltic waves.	Tube should have reached the duodenum.
8. The air is left in the balloon and "duodenum resistance" is tested again in 20 minutes. If resistance is still felt, the air in the balloon is increased to 25 cc. The syringe is removed and the tubing on inflation side of the metal Y is clamped off.	2 or 3 cc. of mercury are sometimes used in place of air to inflate the balloon.
9. If the tip of the tube does not pass into the duodenum the balloon is inflated with 30 cc. air, and the tube withdrawn until resistance is felt at the cardiac end of the stomach. The balloon is then deflated. The syringe is transferred to the tubing on the free arm of the glass Y tube and 300 cc. of air is injected into the stomach. The tube is then advanced 1 inch every 5 minutes as before. If peristalsis fails to carry the tip into the duodenum, the tube is sometimes passed under fluoroscopic guidance with the aid of a stylette.	The air in the stomach separates the walls of the stomach and helps prevent the tube from becoming coiled.
10. After the tube is in the duodenum, it is advanced, manually or by peristalsis, about one foot per hour, or as rapidly as the patient can tolerate.	

11. If the tube is used for diagnosis, it is allowed to pass until it fails to pass further, indicating it has reached the point of obstruction. The doctor may order fluoroscopic studies to determine the location of the tube. The suction lumen is clamped off and the tubing is disconnected from the suction machine.

The patient should be taken on a litter to the fluoroscopic room.

12. If the tube is used for therapy, it is allowed to pass well into the small intestine (or remain in the stomach as the case may be).

C. Care of the Patient

1. Give frequent mouth care while the tube is in place.
2. Oil the nares twice daily or as often as necessary.

Mineral oil is preferred because it is bland and nonodorous.

3. If irrigations are ordered, close clamp on tube leading to suction apparatus. Open clamp on free arm of glass Y tube and inject 60 cc. water or normal saline with a syringe. Solution is withdrawn by syringe or by opening the clamp on tubing leading to suction apparatus.
4. Keep an accurate account of intake and output. Include amount of fluid taken by mouth, amount of fluid instilled for irrigations, amount of drainage collected for the 24 hours.
5. Record in nurses' notes: Time, procedure, amount and description of return solution, and patient's reaction.

D. Removal of the Miller-Abbott Tube

1. The tube is removed according to the directions of the doctor. The suction apparatus is disconnected. The balloon is deflated and the tube is withdrawn, about 3 inches every 5 minutes.
2. If the tube is well into the intestines, the balloon is deflated, and the tube is severed. The tube is eventually expelled from the patient's rectum.

E. Care of Equipment

1. Remove adhesive material with ether
2. Immerse entire tube in warm soap suds. Detach balloon and by means of a syringe force soapy water through each lumen until thoroughly clean. Soak tube for a few hours in soapy water until all odor has disappeared.
3. Rinse in clear water and dry tube by suspending it by one end.
4. Return tube (without glass Y assembly) to Centralized Matériel Section.

GASTRIC AND INTESTINAL INTUBATION

LEVIN TUBE

REHFUSS TUBE

Purpose: To relieve distention and afford drainage of the gastro-intestinal tract.

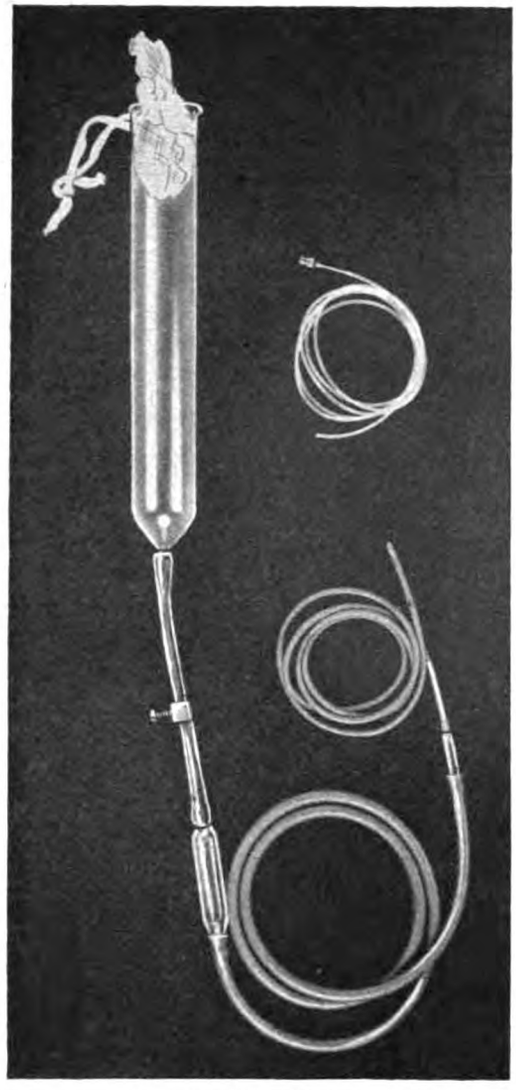
METHOD	IMPORTANT POINTS
A. Procedure for Insertion of Tube	
1. Prepare equipment. Place tube in basin of ice.	
2. Explain the nature of the procedure to patient.	
3. The tube is passed by the doctor with nurse giving whatever assistance is necessary.	If the patient has removable dentures, these should be taken out before the tube is passed.
4. The tube is inserted in the usual manner and advanced until the first marking on the tube is at the patient's nostril (or lips). To make certain that the tube is not in the trachea, feel for the movement of air at the end of tube or hold end of tube under water noting whether air bubbles through the water.	
5. The tube is then advanced to the second marking (18 inches) and the stomach contents aspirated with the syringe. If the aspirated fluid is identified as stomach contents the tubing is attached to the suction apparatus.	See procedures for operation of Wangensteen suction and electric suction apparatus.
6. If tubing is to be introduced into the duodenum it is passed to the third marking (or about 26 inches from the tip). Location of tube is tested with a syringe. Aspirated fluid will be bile stained indicating that the tube is in the duodenum.	The tube should be advanced only a few inches at a time or it will remain coiled in the stomach.
B. Care of the Patient	
1. Give mouth care at least four times daily.	
2. Oil the nares twice daily or as often as necessary.	
3. Observe functioning of suction apparatus and note drainage.	
4. Irrigate tubing as ordered, and as often as necessary to keep lumen of tubing clean.	
5. Inform patient whether he is permitted fluids.	
6. Compute the amount of intake and the amount of drainage each 24 hours.	
C. Procedure for Irrigating the Tube	
1. Close clamp leading to suction apparatus.	
2. Fill an asepto syringe with warm water or normal saline and insert the tip into the end of the tubing. Apply gentle pressure on the bulb and slowly introduce about 30 cc. of solution. Remove solution with syringe and repeat the process once or twice or until the lumen of the tube is clear. Solutions may be aspirated by connecting the tubing to the suction apparatus.	A 5% sodium bicarbonate solution will provide a good solvent for mucus if the tube is obstructed.
D. Procedure for Administering Medications or Nutritive Fluids by Tube	
1. Close clamp leading to suction apparatus.	
2. Using an asepto syringe inject a few cubic centimeters normal saline into tubing to clear the tube.	
3. Introduce the prescribed medications or fluids slowly and under low pressure.	Medications given by tube must be put into solution so that they may be given easily without plugging the tube, and to facilitate absorption.
4. Follow the injection with about 20 cc. normal saline to clear tube.	
5. Discontinue the suction for about 1 hour, unless ordered otherwise, to prevent the material from being suctioned back and to insure absorption.	

E. Procedure for Administering Medications or Fluids Orally

1. Clamp tubing leading to suction apparatus.
2. Administer drugs or fluids orally, as ordered.
3. Discontinue suction for 1 hour unless otherwise ordered, to allow for absorption and to prevent the material from being suctioned back.

F. Care of Equipment

1. Wash tubing thoroughly with soap and water. Force water through lumen with syringe.
2. Rinse with clear water. Dry by forcing air through tubing with syringe. Return tubing to Centralized Matériel Section.



Feeding Set

GAVAGE

Equipment

Sterile tube feeding set:
- Graduated flask.
- Rubber tubing, 4′.
- Vaco drip.
- Glass needle adaptor.

Sterile asepto or 30 cc. syringe tubes as ordered:
- Rehfuss.
- Levin.
- Polyethylene.*

Basin with cracked ice.
Basin, curved.
Medicine glass.
Adhesive tape.
Rubber sheet and towel.
Standard.
Prescribed liquids, formula, or medication.

*Plastic tubes should never be placed in ice.

Purpose: To provide nourishment when food cannot be taken by mouth.

METHOD

A. Procedure

1. Place the patient in desired position, sitting or semirecumbent, near the edge of bed. Arrange rubber sheet and towel across chest.
2. If the gastric tube is unmarked, measure from bridge of nose to end of the sternum and mark with adhesive tape.
3. The doctor inserts the gastric tube with the nurse assisting as necessary. The tube is lubricated and inserted through the nostril or mouth. The patient is instructed to swallow. The tube is pushed gently downward each time the patient swallows, the interval when the musculature of the esophagus is relaxed.
4. The tube is advanced until the first mark on the tube reaches the tip of the patient's nose (or lips). The location of the tube should be tested before any solution is allowed to run in. If gastric contents can be withdrawn with a syringe the tube is in the stomach.

IMPORTANT POINTS

5. For a "drip gavage" the gastric tube is connected to the glass adaptor on the feeding set. The flow of formula is adjusted to the prescribed rate. The tubing is secured to patient's forehead with adhesive tape.
6. If the gastric tube is to remain in place for subsequent feedings, disconnect the feeding set and introduce 30 cc. sterile water with a syringe to flush tube. The tube is kept clamped between feedings.
7. Wash flask and tubing, rinse thoroughly with cold running water. Place a piece of gauze over flask to keep it clean for the next feeding.
8. Record in nurses' notes: Time of treatment, kind and amount of formula.

Gavage may be done without the use of the feeding set. In this case the syringe is attached to the end of the tube and the fluid is introduced through the syringe.

B. Care of Equipment

Wash articles with soap and water. Rinse with clear water and dry. Return to Centralized Matériel Section.

MEDICINE AND TREATMENT CART

A. Equipment

Table with swivel rubber wheel casters consisting of:

Medicine tray top, removable with:

24 medicine glass capacity.
24 medicine card slots.
1 pitcher, 1⅞ quarts.
1 tray, covered, 9 x 5 x 2.

Drawer with:

1 syringe rack for 12, 2 cc. or 5 cc. syringes.
12 clip holders for medicine cards.

Lower shelf with:

1 basket, neoprene covered.

B. Care of Equipment

Wash medicine cart daily with soap and water.
Polish with a dry cloth.

NURSING CARE IN THERAPEUTIC TREATMENT WITH RADIOACTIVE ISOTOPES

Treatment with Therapeutic Dose I^{131}
Treatment with Therapeutic Dose P^{32}
Radioactive iodine uptakes

Purpose: To apply radiation in the treatment of certain specific diseases by the introduction of radioactive material into the body.

METHOD

A. General Instructions

1. The dose of I^{131} or P^{32} is prepared in the Isotope Laboratory and is administered to the patient on the ward by a member of the medical staff of that department.
2. Problems or questions arising concerning the care of a patient treated with radioactive materials should be referred to the Biophysics Department.
3. It is within the range of safety for the nurse to give all the necessary care and treatments required by the patient.

B. Procedure in Treatment with Therapeutic Dose of I^{131}

1. Instruct the patient about the treatment. Instruction should include telling him that he is receiving a fairly large dose of radioactivity; the radioactivity will not be dangerous to him but will help improve his condition; for 48 hours he will be somewhat dangerous to others and will, therefore, be isolated; he will not be affected anywhere but in the area of his disease.
2. Isolate the patient's unit (room or section of the ward) for a period of 48 to 72 hours. Place a "No Admission" sign on the door.
   Personnel will enter only when necessary during the period of isolation.
   Provide an extra table in the isolated unit.
3. Obtain a special large urine bottle from the Isotope Laboratory. Place the bottle in a large step-on can in the corner remote from the patient and from the entrance to the isolated area.
4. Following the administration of I^{131} only authorized personnel, i. e., doctors, nurses, and laboratory technicians will enter the patient's room.
5. All urine is saved for 24-hour periods for 3 days. The urine is placed in the special urine bottle and collected by the laboratory technician every 24 hours.
   If patient is a bed patient, the nurse will wear gloves to empty the bed pan.
6. Linen is discarded with the general ward linen unless the patient is incontinent or has profuse diaphoresis. When this occurs the linen is put in a bag in the corner of the room and collected daily by the laboratory technician.
   Ambulatory patients will make their own beds.
   The nurse will wear gloves when changing the linen of an incontinent patient.
7. If a patient vomits, the vomitus is flushed down the commode.
   Linen soiled with vomitus is placed in a laundry bag for processing by the laboratory.

IMPORTANT POINTS

Radioactive iodine and phosphorous are colorless, odorless and tasteless liquids which are given by mouth in normal saline solution. Normal saline is used because it expedites the absorption of the radioactive substance from the gastro-intestinal tract into the circulation.

I^{131} is excreted principally through the kidneys, therefore, urine is high in radioactivity.

8. Report the spilling of material containing or suspected of containing radioactivity to the Biophysics Department.
   If it is necessary to take immediate steps (e. g., the spilling of a bedpan) don rubber gloves and sop the spilled matter with paper towels or other absorbent material. Retain the absorber in a container until it can be discarded or otherwise processed by the Isotope Laboratory.
9. Food trays are placed on the extra table in the room. The patient takes the tray from the table and returns it to the table when he has eaten.
   Trays are collected with the ward trays.
   Special care is not required for dishes or silver.

   Direct contact with patient should be kept at a minimum.
10. Equipment used in the care of these patients is cared for in the same manner as other patients.

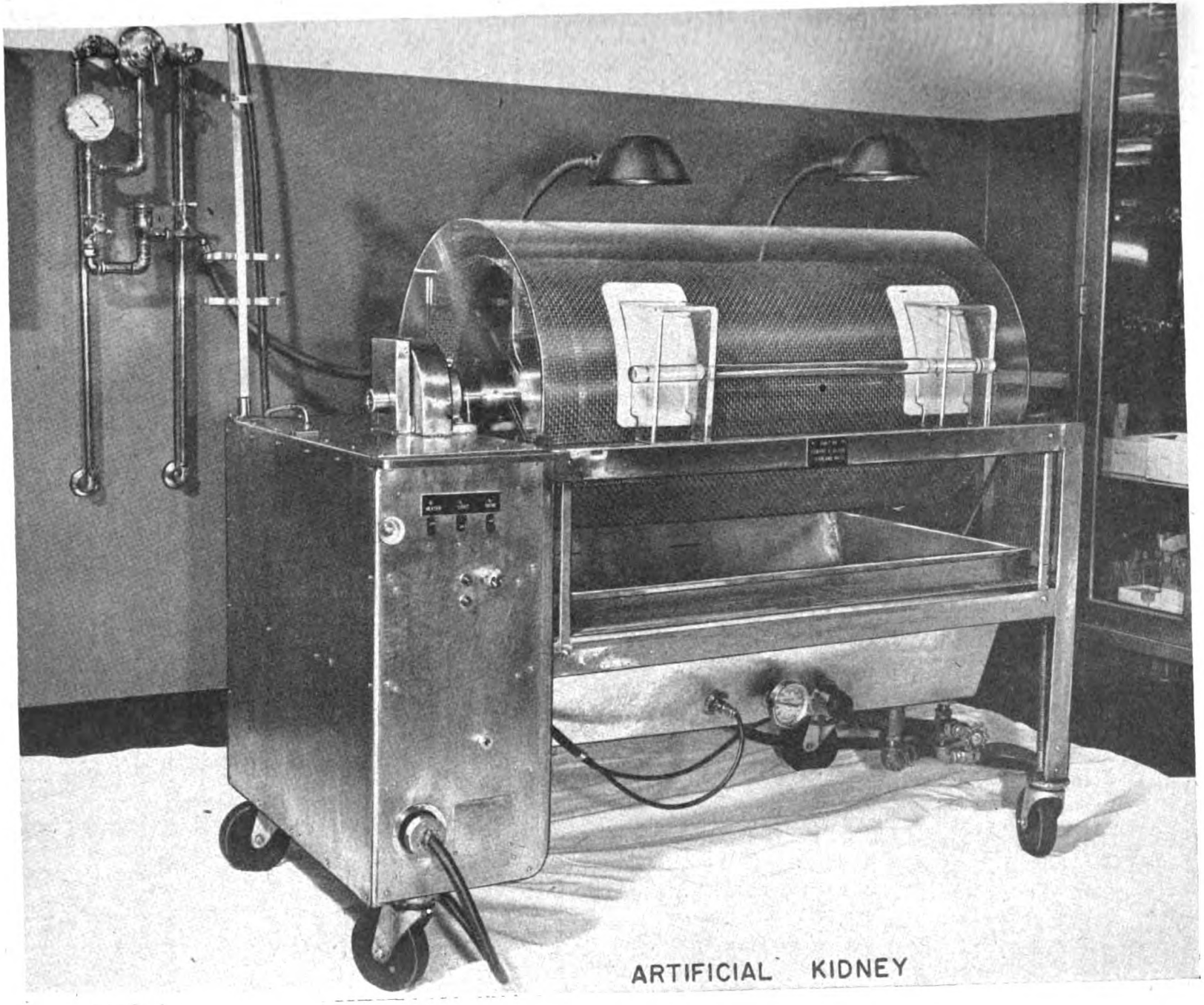
C. Procedure in Treatment with Therapeutic Dose of P^{32}

1. Isolation as outlined above is not necessary because of the type of the radioactive isotope and the small size of the dose.

   P^{32} is excreted through the intestinal tract.
2. In some cases the patient is not told of the exact nature of the medication if such a course seems wise.
3. No special routines need to be followed in the care and treatment following the administration of the dose.
   Nurse or technician will wear gloves when removing the bedpan from bed patient.

D. Procedure for Radioactive Iodine Uptakes

1. The dose is administered by a staff member of the Isotope Laboratory.
2. No special preparation or routines are required.



ARTIFICIAL KIDNEY

NURSING CARE IN TREATMENT WITH THE ARTIFICIAL KIDNEY

Purpose: To adjust chemical abnormalities in the blood by hemodialysis in severe renal diseases, drug intoxication and renal insufficiency.

METHOD	IMPORTANT POINTS
A. Explanation of the Artificial Kidney	
The artificial kidney is a device which makes possible external dialysis of blood whereby abnormal concentrations of chemicals and waste products are removed from the blood when the kidneys are not functioning. The artificial kidney consists of a dialyzing membrane (120 feet of cellophane) wound in spiral fashion around a large drum. The rotating drum is immersed in a tank containing a dialysate bath of 100 liters of water to which has been added calculated amounts of normal extra-cellular components—glucose, sodium bicarbonate, sodium chloride, calcium chloride, magnesium chloride and potassium chloride. As the blood courses through the semipermeable membrane, there is an exchange of the metabolytes of the blood with the bath fluid. Exposing blood to this diffusion is called hemodialysis. Blood from the patient's radial artery is passed through a rotating coupling to the surface of the drum and hence through the length of the diffusion membrane. When the blood reaches the distal end of the membrane it leaves another rotating coupling to a pump.	This means of dialysis may be lifesaving in a patient with an acute or chronic kidney shutdown, especially if there is a tendency to potassium intoxication. It has also been lifesaving in acute barbiturate poisoning when other measures have failed.
This device brings the blood into a burette where air bubbles are removed. From there the blood flows by gravity through a clot strainer and into the plastic tubing leading into the antecubital vein of the patient.	It is usually necessary to change the bath fluid twice during a "kidney run."
Blood is carried through the circuit at the rate of 200 to 300 milliters per minute.	It must be emphasized that the use of the artificial kidney is a temporary measure only. The patient cannot be maintained indefinitely without his own kidney function.
The average hemodialysis time is 6 hours.	
B. Preparation of the Patient	
1. Mental preparation—The patient is likely to be fearful and apprehensive. If the patient's condition permits, the procedure should be explained to him. A sedative is usually given prior to treatment and during the treatment if it is needed. The patient should never feel that he is "forgotten." Reassure him frequently and give careful attention to needs and requests.	Some patients may be in a comatose state, others may be irrational. Either of these require careful observation at all times.
2. The patient's weight, temperature, pulse, respirations, and blood pressure are taken and recorded.	
3. Bath, back rub, oral hygiene, and other comfort measures are given before the treatment is started.	Every effort should be made to keep the patient comfortable during the long hours of the treatment.
4. A catheter may be inserted and attached to a urine collection bottle. Conscious patients may use the bedpan.	
5. Special padding should be provided for all bony prominences to relieve pressure. The arm board on which patient's arm is placed should be well padded.	
C. Preparation for the Procedure	
1. The arm selected for cannulation is surgically prepared and infiltrated with a local anesthetic. A cut-down procedure is done to expose the artery and vein and the cannulae are inserted.	
2. An initial dose of heparin, usually 100 mgm., is introduced into the vein as soon as the needle is introduced.	
3. The cannulae are attached to the outflow and inflow tubes from the kidney apparatus.	

D. Nursing Care of Patient Receiving Treatment with Artificial Kidney

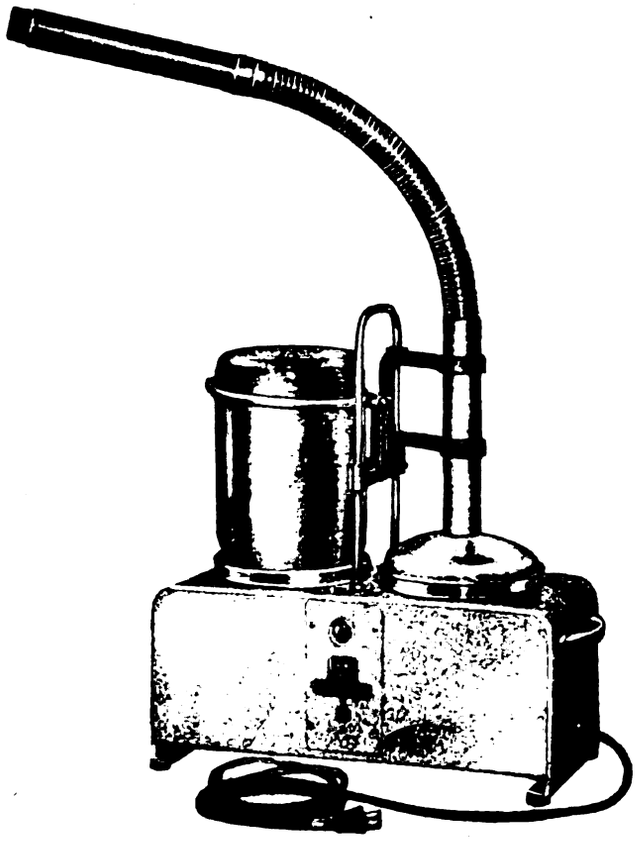
1. Charting—Detailed and accurate notes are important. The charting done during the "run" should give almost minute-by-minute information of the patient's condition.
   Notes should be made on changes in patient's condition, time medications are given, time the bath fluid is changed, time blood samples are taken, when urine is voided and amount, signs of bleeding around cannula sites, or evidence of bleeding from other parts of the body.

   Because of the marked physiological changes resulting from dialysis there may be unusual manifestations apparent in the patients.
2. Blood pressure—Determinations are made every 15 minutes during the "run." If the pressure shows variations, readings should be taken every 5 minutes until the pressure is stabilized.

   A sharp drop in blood pressure may result in "bleeding into the kidney." Conversely, a sharp rise in blood pressure may result from too rapid infusion of blood. Since heparin prolongs the prothrombin time all drainage, vomitus and excreta should be examined for blood.
3. Medications—Heparin may be repeated during the period of dialysis.
   Sedatives are given if patient is restless. If oral medications are contraindicated, drugs are usually given subcutaneously.
   Intravenous medications are sometimes given through the venous cannula or burette.
4. Fluids and foods—Food and fluids are generally withheld during the treatment. An accurate account must be kept on fluid intake and output.

   Because of the lack of urinary output these patients are prone to develop pulmonary edema if excess fluids are administered.
5. Urine—Any urine voided, should be accurately measured. All specimens are saved for clinical determination on the 24-hour volume.

   Without an accurate knowledge of fluid output, the physician is unable to determine the necessary fluid requirements.
6. Care of cannulated arm—The arterial and venous cannulae must be maintained in the proper position at all times. The arm should be supported whenever any care is given as the least change in the position will alter or slow down the flow of blood and interfere with proper function of the dialysis.
7. When the treatment is terminated, dry sterile dressings are applied to the arm after the cannulae are removed.
8. The patient remains in the operating room until his blood pressure, pulse and respirations are stabilized. The patient requires close attention during the post treatment period.
9. The patient is weighed when his condition permits.



Electric Steam Inhalator

OPERATION OF THE ELECTRIC STEAM INHALATOR

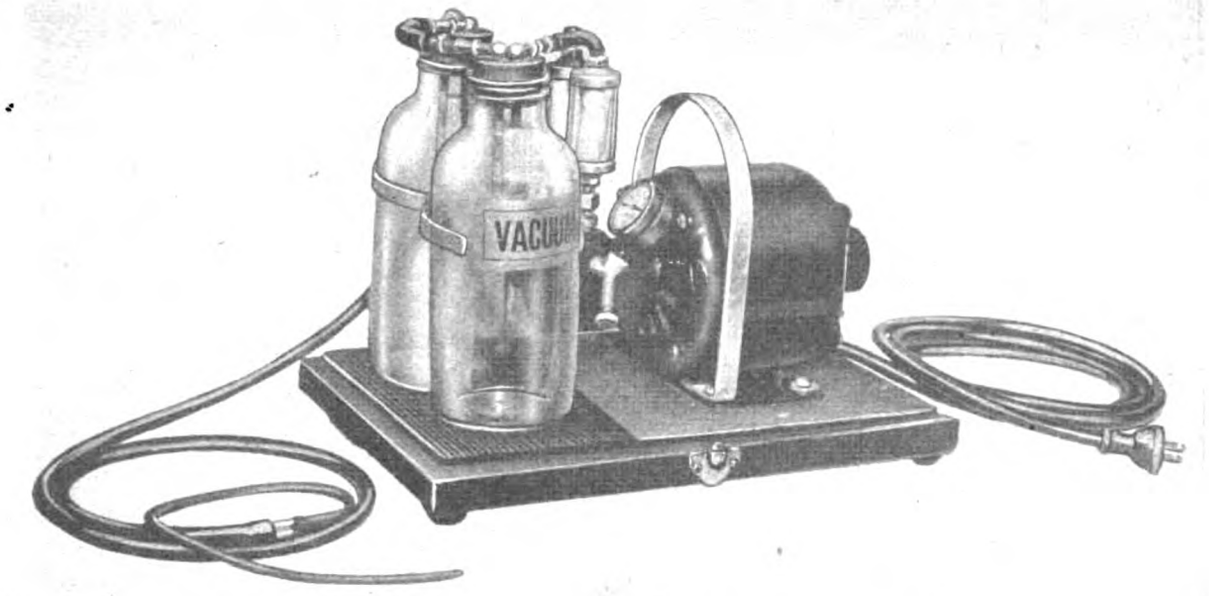
Purpose: To relieve inflammatory conditions of the upper respiratory tract by increasing the humidity of air inspired by the patient.

A. Operation of the Electric Inhalator

1. Pour compound benzoin tincture (or menthol, turpentine oil or camphor as ordered) into the cup under the chrome drum spout.
2. Fill the gallon jug two-thirds full with water. Invert jar into the water reservoir and fit parts together securely.
3. Place apparatus on the floor near the patient's bed. Direct the spout so that there will be no possibility of the patient being burned.
4. Screen the patient or close door and windows if the patient is in a private room.
5. Administer steam treatment for length of time prescribed.
6. Refill the water jug before it becomes empty.

B. Care of Equipment

1. Empty, wash, and dry water jug. Scour medication cup.
2. Return inhalator to Centralized Matériel Section.



PORTABLE ELECTRIC SUCTION MACHINE

OPERATION OF THE ELECTRIC PORTABLE SUCTION MACHINE

Purpose: To aspirate mucus and excess secretions from a body cavity.

A. Equipment

Portable rotary pump suction machine with tubing, suction, bottle, overflow bottle and glass adaptor.
Basin, curved.
Catheter, French, No. 10-16, as indicated.

B. Operation of the Suction Apparatus

1. Place suction apparatus near the bedside and plug electric cord into wall socket.
2. Attach catheter to glass adaptor.
3. Test apparatus. Place catheter tip in the basin of water and turn "on" the machine. Suction water through the tube.
4. To aspirate place catheter tip in the cavity and rotate until excess secretions are removed.
5. Suction water through the catheter after each use.
6. Empty the suction bottle as necessary.

C. Care of Equipment

1. Clean the bottles, catheter, and tubing with soap and water. Boil 10 minutes.
2. Return the suction machine to Centralized Matériel Section.

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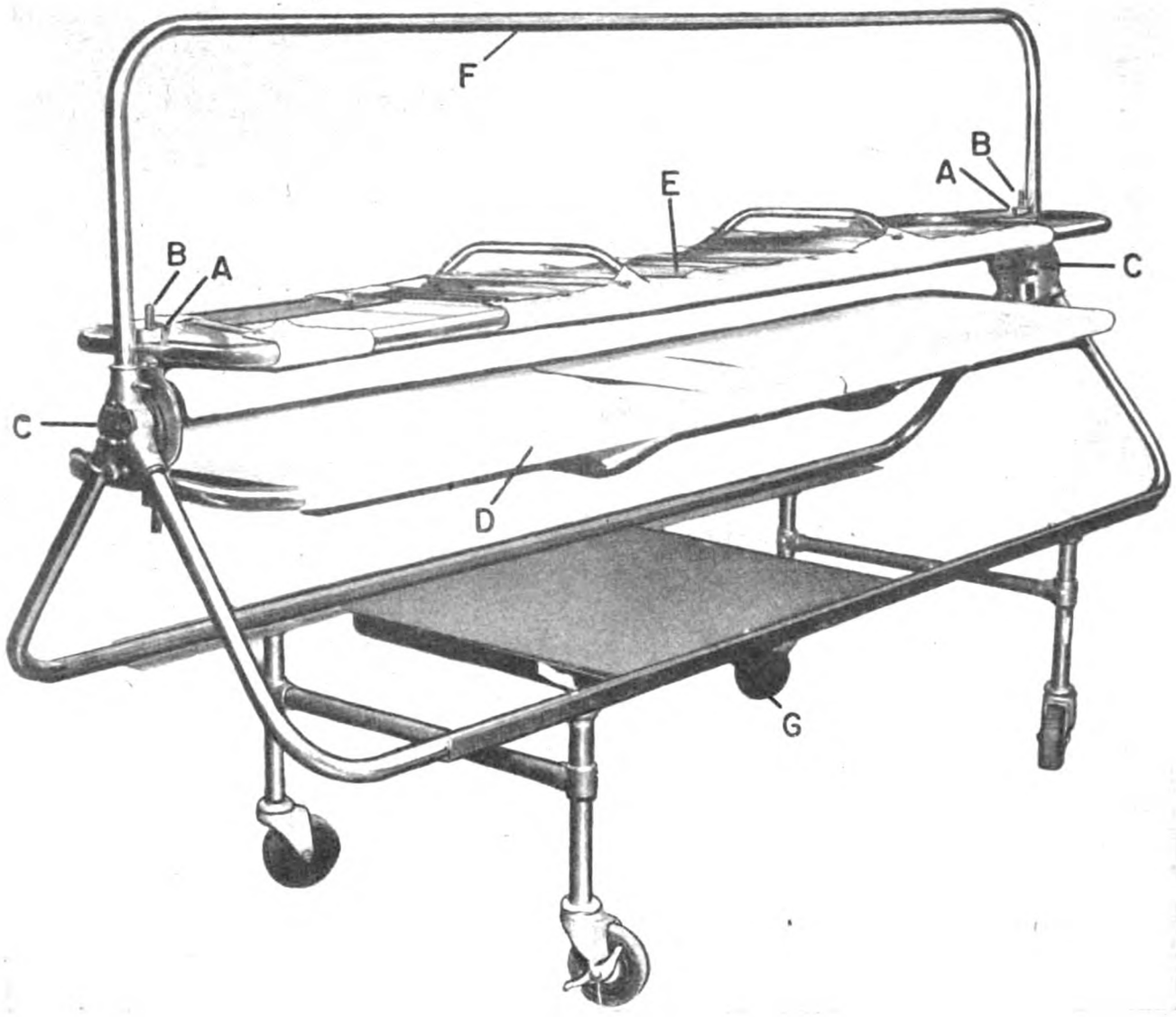
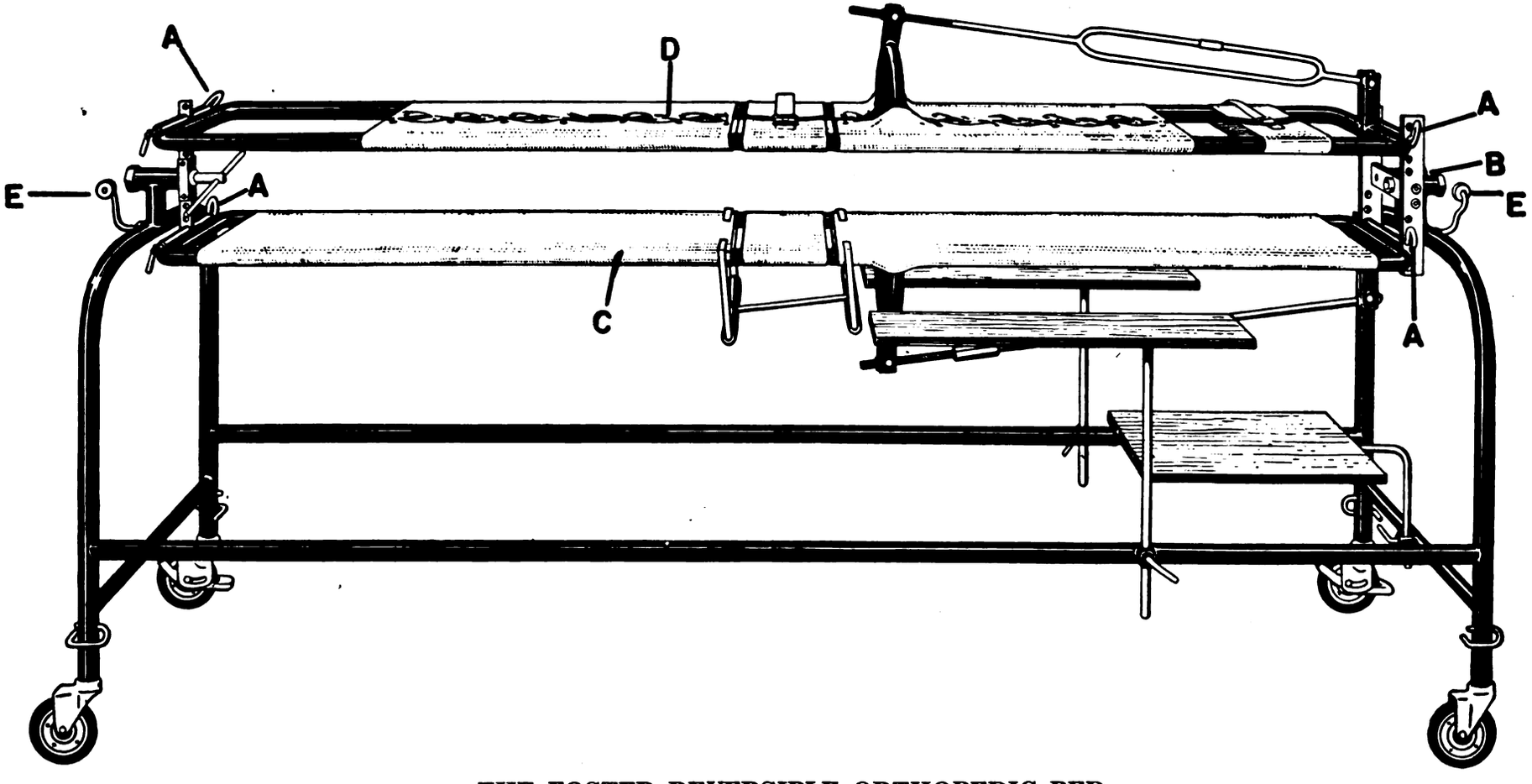


THE STRYKER TURNING FRAME

A Round nuts
B Pivots of turning discs
C Locking springs
D Posterior frame
E Anterior frame
F Overhead bar
G Sliding utility tray



THE FOSTER REVERSIBLE ORTHOPEDIC BED

A Frame locking bars
B Safety lock "T" handle
C Posterior frame
D Anterior frame
E Traction pulleys

OPERATION OF THE STRYKER TURNING FRAME
OPERATION OF THE FOSTER REVERSIBLE ORTHOPEDIC BED

Purpose: To provide immobilization, physiological rest and to facilitate nursing care for the patient who needs frequent changing from supine to prone position.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. The underlying principles of operation for the Stryker frame and the Foster bed are the same with slight variations in technique.	Uses of the Stryker frame and the Foster bed: Spinal cord injuries. Tuberculosis of the spine. Spinal and pelvic fractures. Spinal fusions. Vesico-vaginal fistulae. Burn cases.
2. The Foster bed can be adjusted for hyperextension. The Stryker frame requires separate hyperextension frames.	
3. Both can be elevated at either the foot or head end to provide traction in pelvic and intertrochanteric fractures or for fractures of the cervical vertebrae.	
4. Both have a rotary bearing, pulley traction apparatus at each end for the maintenance of traction during the turning process.	
5. Obtain the assembled unit from the Centralized Matériel Section.	
B. Equipment	
The Stryker frame: Anterior and posterior frames with canvas covers. Overhead bar. Cart with sliding utility tray. Face support. 2 arm supports. 4 stabilizer arms (for placement between frame legs when patient is transported in plane or ambulance).	
The Foster bed: Anterior and posterior frames with canvas covers. 2 arm boards. 1 reading board. 1 bedpan rack. 1 foot traction piece. 2 traction pulleys.	
C. Position of the Patient	
1. The purpose for which the patient is placed on the frame, i. e., whether immobilization of the spine is required or not, governs the position in which the patient must be maintained and the amount of motion permitted.	
2. The canvas frame covers are held in place and are kept evenly and continuously taut by wide flat rubber bands with removable hooks which are attached to the brass eyelets along the sides of the canvas.	
3. The anterior frame cover should extend from just below the shoulder girdle to the internal malleolus. If in one piece, a round perineal opening is provided. If the divided anterior covers are used, the upper cover should extend to the symphysis pubis. A 4–6-inch perineal opening is left between the two covers. A removable buckle strap supports the opening.	In the prone position, the feet should hang free and perpendicular to the floor.
4. The posterior frame covers are divided with a 4–6-inch perineal opening which should correspond to the opening on the anterior frame. The buckle strap covering the opening should be kept in place at all times except when the bedpan is being used. The heels should be elevated and free from pressure when the patient is on the posterior frame. Place the foot support so that the feet are at right angles with the legs.	Sagging of the buttocks through the perineal opening will result in poor spinal alinement. Plantar flexion must be maintained to prevent foot drop.

5. Place an abdominal pad between the inner aspects of the ankles if the patient is paralyzed.
6. Change the position of the arms by placing pillows on the arm supports.

Change in arm position prevents adduction of the shoulder and flexion contracture of the elbow.

7. Keep the knees slightly flexed when the patient is on the posterior frame by placing a small roll of bath towels or a pillow beneath them.
8. Only a small, and preferably no pillow, should be used while on the posterior frame if immobilization of the spine is being maintained.
9. If ice-tong traction or halter traction (for cervical fractures) or skeletal traction has been applied, the nurse should understand the principles involved in each case as the traction must be maintained at all times.

Traction will remain constant when the frames are turned.

10. To hyperextend the Foster bed:

    The point of hyperextension is determined by the doctor.

    The patient's buttocks should be directly over the cutout for the bedpan and the patient measured to the point where the hyperextension should begin.

    The frame hinge lock pins on the sides near the head end of the frames are pulled out and the hinges are slid to the point where the hyperextension is desired.

    Each frame is adjusted to exactly the same degree of hyperextension.

D. Turning the Patient

1. Remove the foot supports if the patient is lying on the posterior frame.
2. Clamp and detach drainage tubes if any are in use.
3. Place pillows over the lower extremities to prevent the legs from slipping during the turning process.

Reversal of position is achieved by fastening the two frames together with the patient between them and turning the 3 parts as one, 180° around a horizontal axis.

4. Remove arm supports.

    Instruct the patient to wrap his arms tightly around the frame before turning is begun.

    If the arms are paralyzed they are crossed on the chest and a pillow is placed over them.
5. To turn the Stryker frame:

    Remove round nuts and lower the second frame on the pivots of the turning discs. Press down firmly and tighten nuts securely. The patient should fit snugly between the two frames. Place turning straps around the frames at the level of the arms, hips and knees as necessary if additional safety measures are needed. Pull out the locking springs, warn patient, then quickly and smoothly rotate the frame. Should the frame be turned by one person, the operator moves to the side of the patient after the locks are disengaged. The frame is then turned towards the operator for greater security. After turning is complete, tilt the frame gently if the spring locks do not catch. The spring locks must be securely locked, extending through both frame discs.

    The round nuts should be kept on the pivots when not in use to prevent their being lost.

    Remove top frame. Attach added supports, drainage tubes and place pillows as desired. Replace round nuts on the pivots.

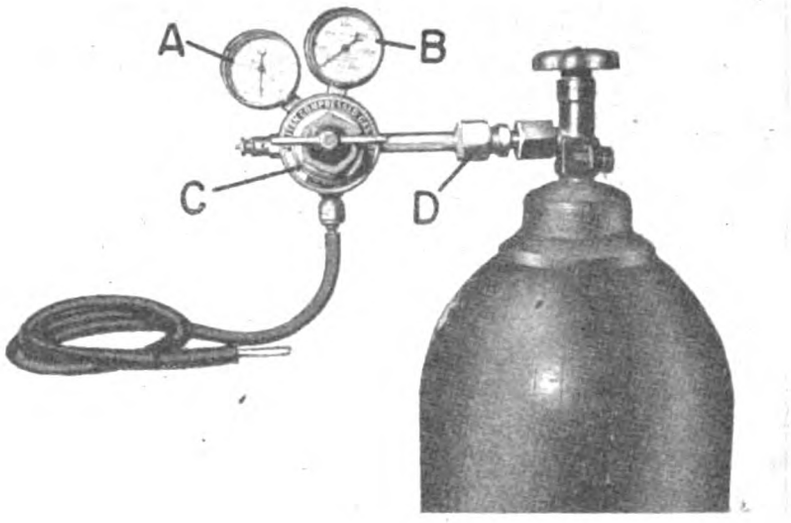
6. To turn the Foster bed:

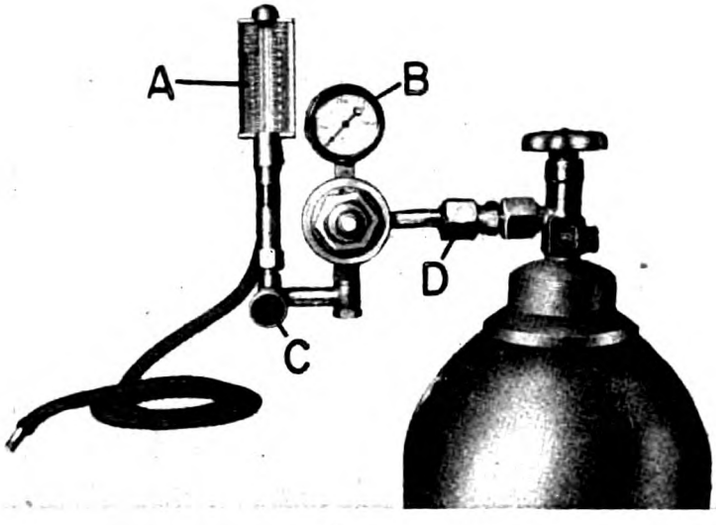
After preparing the patient, lower the second frame over the patient. Fit the frame locking bars through the corresponding holes first at the head end and then the foot end of the bed. Loosen the safety lock "T" handle and while grasping the lock with one hand turn the patient. After turning, tighten the "T" handle safety lock.

If one person turns the patient, he should stand at the side of the patient near the head end.

Grasp the safety lock with the right hand and the frame with the left and turn towards the operator.

Remove the frame locking bars, lift off the top frame and replace the frame locking bars in the holes in the head and foot assembly units.





TYPES OF OXYGEN REGULATORS

A Liter flow gauge
B Cylinder pressure gauge
C Pressure reducing regulator
D Valve seat connection

OXYGEN ADMINISTRATION

Purpose: To increase the concentration of oxygen in the blood when there is an interference with the normal oxygenation of the blood and tissues.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. Order oxygen on Centralized Matériel Requisition. Specify type of gauge and mask desired.	
2. Oxygen cylinders are obtained from Hospital Personnel and Service Department. Ward personnel will call for and return oxygen cylinders and equipment.	
3. Requests for helium-oxygen mixture must be written on prescription blank and signed by the doctor.	
4. Oxygen analyzer is usually not signed out to a requisitioning agency. When this test is ordered personnel from Central Materiel Service will bring the apparatus to the ward and make the analysis.	
5. Empty cylinders should be returned promptly to the tank room with cardboard tag, marked "Empty", tied securely to the tank.	
6. The valve protection caps on oxygen cylinders should be kept on the cylinders until they are ready for use and replaced as soon as the regulator is removed.	
7. The "No Smoking" sign must be conspicuously posted and the regulation enforced wherever any type of oxygen equipment is used.	
8. Oxygen equipment must not be set up or allowed to stand near steam pipes, radiators or where sunlight will strike it.	
9. Never use oil or grease to lubricate (or polish) regulators, fittings, valves, gauges, or wrenches. Equipment must never be handled with oily or greasy hands. Equipment which does not operate properly or is in need of repairs should never be used.	Oxygen under pressure, coming in contact with oil or grease may ignite explosively.
10. Electrical appliances such as electric call bell, heating pad or electric razor should never be used under the canopy.	
11. X-ray apparatus or similar devices should not be brought into the room where oxygen is being used.	
12. Rubbing alcohol or oil should not be used on the patient while the oxygen apparatus is in operation.	
B. Procedure for Attaching and Operating the Regulator	
1. The regulator consists of (*a*) liter flow gauge, calibrated in liters per minute, to control flow of gas; (*b*) cylinder pressure gauge (or high pressure gauge), calibrated in pounds per square inch, to show amount of gas in cylinder; (*c*) pressure reducing regulator (handwheel or flow adjusting screw) to reduce pressure to a usable and regulated level; (*d*) valve seat connection (for attaching regulator to cylinder).	The cylinder contains oxygen under 2,000 pounds. The regulator makes it possible to use the oxygen with safety, and at a low even rate.
2. Remove valve protection cap from the oxygen cylinder. Open the valve on the tank and close immediately. This "cracking" of the cylinder dislodges any dirt or dust particles. Clean the regulator inlet before attaching.	Always point valve opening away from the body and use two hands to open valve.
3. Attach the regulator to the cylinder valve, tightening the connection nut with a wrench.	
4. Turn regulator handwheel to the left until loose. (On regulators that have a flow adjusting screw in place of the handwheel, the adjusting screw should be closed before the valve is opened.)	

5. Turn cylinder valve slowly to the left and open completely. (This is done if there is a handwheel on the regulator. If there is an adjusting screw, the cylinder valve should be turned slightly, and not opened completely until the needle on the gauge stops moving.) Pressure within the cylinder is registered on the cylinder pressure gauge.
6. Turn regulator handwheel (or flow-adjusting screw, as the case may be) to the right until the needle on the flow gauge indicates the proper flow of oxygen in liters per minute.

It is most important never to permit oxygen to enter the regulator suddenly. Open cylinder valve very slowly.

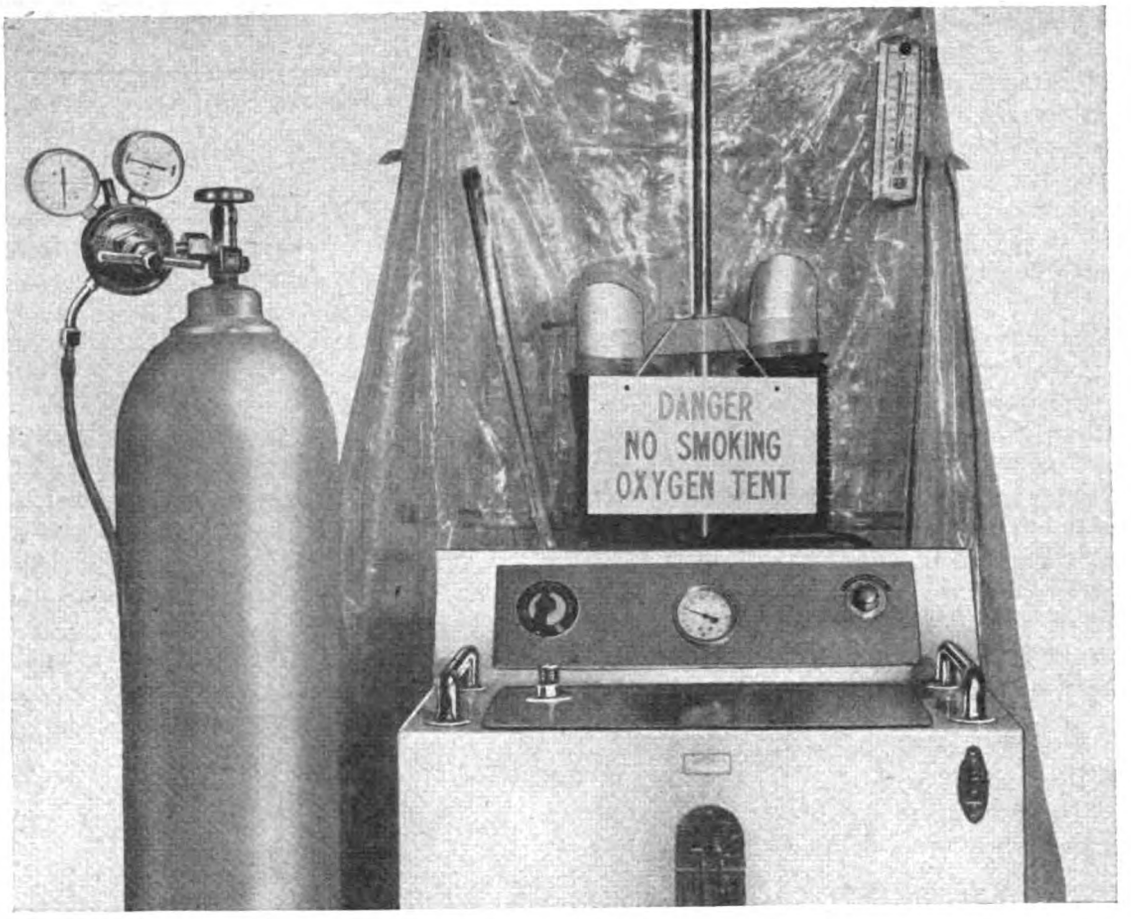
7. To discontinue gas flow, close cylinder valve, and allow the indicator on the cylinder pressure gauge to drop to zero. Turn handwheel (or flow-adjusting screw) to left until loose.
8. If continuous oxygen is being used have another cylinder ready when 100 pounds of oxygen remains in cylinder.

A cylinder of oxygen (1,500 gallons) used at a rate of 8 liters per minute will last about 12 hours.

9. A humidifier is sometimes attached to the regulator. The humidifier assembly consists of a clamp with two double hole stoppered bottles attached to the back of the regulator.
   One bottle (the one in the clamp nearest the cylinder) is filled half full of water. Through the stopper in this bottle is inserted the metal tube with the gas spray attachment. When the oxygen apparatus is in operation oxygen bubbles through the water in the bottle.
   The other bottle, empty, serves as a trap for any excess water that may be carried out of the first bottle. Tubing attached to this bottle is connected to the long rubber tubing leading to the oxygen equipment used by the patient.

The humidifier is used to overcome the drying action of oxygen on the mucous membrane.

The humidifier is not used with the automatic air-conditioned type oxygen tent.



OXYGEN TENT UNIT

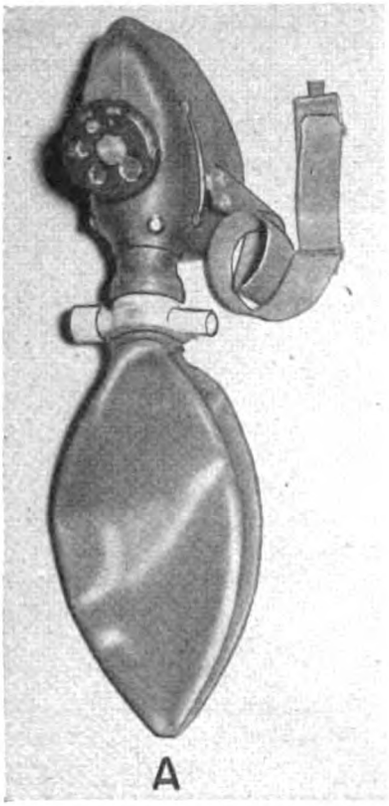
OXYGEN ANALYZER

Equipment

Oxygen tent unit (air-conditioned type) with regulator, canopy and thermometer.
Cylinder of oxygen.
Cylinder strap.
Wrench.
"No Smoking" sign.
Oxygen analyzer (if ordered).

OXYGEN ADMINISTERED BY OXYGEN TENT

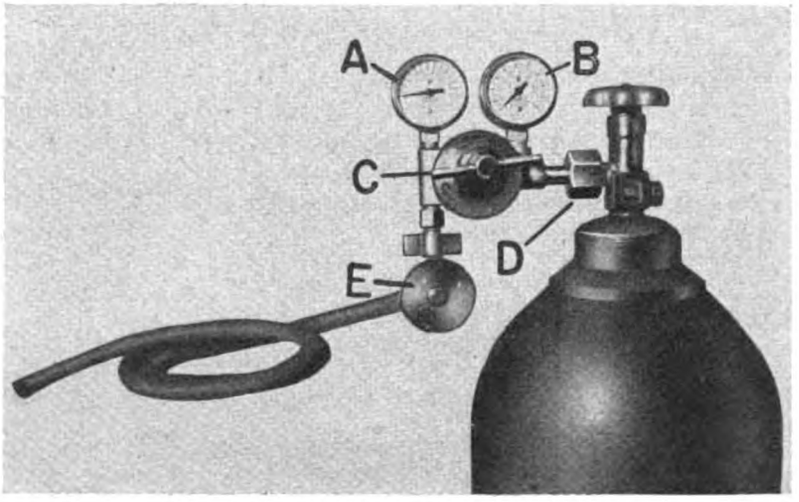
METHOD	IMPORTANT POINTS
A. Procedure	
1. Place rubber sheet over upper half of mattress and cover with a sheet to minimize the absorption of oxygen.	Wool blankets used on bed should be covered with a sheet.
2. Strap oxygen cylinder to head of bed.	
3. Roll oxygen tent unit to bedside. Remove regulator from regulator holder on the cabinet and attach to cylinder. (See directions for attaching regulator under "B" in *Oxygen Administration*.) Adjust regulator handwheel to permit a flow of 15 liters of oxygen per minute.	
4. Connect the oxygen supply tube (outlet located on rear side of cabinet) to the regulator.	
5. Plug cord in wall socket and snap on switch to start motor.	
6. Turn temperature control dial on the control panel to the desired setting, usually 68°. Turn air circulation control to "Fast" position.	
7. Place canopy in position. Tuck canopy under back and sides of mattress. The part of the canopy over the patient's abdomen should be secured in place by means of a folded blanket or sheet.	Apertures should be carefully closed after each time patient care is given.
8. Oxygen is allowed to flow at rate of 15 liters per minute for about 15–30 minutes after canopy is applied. After that, the pressure reducing regulator is adjusted to maintain the concentration prescribed by the doctor.	Approximate alveolar oxygen concentrations obtained are: 4 liters—30%. 6 liters—40%. 8 liters—50%.
9. A double check on the temperature is provided by the additional thermometer which is hung inside the canopy. The temperature within the tent should be maintained at about 58°–68° F. depending on external atmosphere. Should oxygen concentration be unaccountably low, inspect canopy for leaks and check content of cylinder. If more cooling is desired the automatic temperature control should be changed only while the compressor unit is in operation.	The cooling compressor cycles on and off automatically.
10. The drain pan should be emptied every 6–8 hours.	The drain pan receives excess condensation from the cooling chamber.
11. Oxygen concentration is sometimes ordered analyzed every 3–4 hours. This is determined with the use of an oxygen analyzer. Remove the rubber cap on connection nipple on the side of the intake elbow. Attach analyzer tube over nipple. The oxygen concentration registers on the dial of the apparatus.	Concentration within the tent should be between 40–60 percent.
B. Care of Equipment	
1. Wipe the cabinet and its fittings. Wash canopy, inside and outside, with soap and water and dry thoroughly. Replace regulator in holder on cabinet.	
2. Drain and dry the drain pan.	
3. Measure oxygen remaining in tank and mark amount on tag. Secure tag on tank.	
4. Return oxygen tent unit to the Centralized Matériel Section. Return empty oxygen cylinders to tank room.	



A. OEM METER MASK

B. BLB NASAL MASK

C. BLB FACE MASK



REGULATOR FOR USE WITH OEM METER MASK

A Liter flow
B Cylinder pressure gauge
C Pressure reducing handwheel
D Valve seat connection
E Meter

OXYGEN ADMINISTERED BY FACE MASK

(*OEM Meter Mask*)

METHOD	IMPORTANT POINTS
A. Equipment	
Regular and OEM meter. OEM mask and reservoir bag (types of masks: Nasal, oro-nasal, oro-nasal with positive pressure attachment). Cylinder of oxygen. Cylinder strap.	
B. Procedure	
1. Strap cylinder to side of bed.	
2. Attach regulator with OEM meter to oxygen cylinder.	
3. Open cylinder valve. Turn disc on oxygen concentration meter to 45. Adjust pressure reducing regulator to deliver about 6–8 liters of oxygen per minute.	Concentration of oxygen is set on the meter. It is possible to administer any concentration up to 95–100%.
4. Adjust mask to face of patient.	
5. After patient has become acustomed to the mask, turn meter disc to desired oxygen concentration percentage. Adjust liter flow to the rate prescribed by the doctor. A desirable rate is the point where, on inspiration, the reservoir bag will *half empty*, and on expiration will fill up. Regardless of what concentration is being administered, the liter flow should be adjusted to a sufficiently high rate so that the reservoir bag never collapses completely even at the depths of inspiration.	Oxygen concentrations: 25–45% 2 liters per minute. 50–60% 3–4 liters per minute. 90–100% 8–10 liters per minute. If meter mask is used with helium-oxygen mixture (80%–20%) use flow of 7–10 liters per minute. The higher the oxygen concentration setting, the less air will be mixed with the oxygen concentration, and higher liter flow will be necessary. The underlying principle is to eliminate rebreathing and keep carbon dioxide content of inspired air at a minimum.
6. To administer oxygen under slight positive pressure, the OEM mask with the positive pressure attachment is used. This mask has a round metal boxlike calibrated appliance, containing an expiration flutter valve, attached to the front piece of the mask. By adjusting the disc, oxygen can be administered under 1, 2, 3, or 4 cm. of water pressure.	
7. When oxygen concentrations of 70% or higher are used, patients may complain of dryness of mucous membranes. Oxygen can be moistened by introducing water into the concentration meter by means of a syringe to a level visible through the plastic window in the side of the meter.	When the face mask is used, it should be removed every 2 hours (unless contra-indicated). The patient's face is washed, dried thoroughly and powder applied to lessen the irritating effects of the oxygen.
C. Care of Equipment	
1. Wash reservoir bag, mask, and tubing with soap and water. Rinse thoroughly and allow to dry.	
2. Return regulator, OEM meter, and mask to Centralized Matériel Section.	

OXYGEN ADMINISTERED BY FACE MASK

(*BLB Mask*)

A. Equipment

BLB mask (nasal or oro-nasal type with reservoir rebreathing bag and tubing).
Cylinder of oxygen.
Cylinder strap.
Regulator (if helium-oxygen mixture is ordered, use the regulator with the flow meter. The flow meter is calibrated on the left side for the mixture and on the right side for oxygen alone).

B. Procedure (When Oxygen Alone is Used)

1. Strap cylinder to side of bed. Attach the regulator to the cylinder.
2. Open cylinder valves. Adjust pressure reducing regulator to deliver about 8 liters of oxygen per minute.
   If the regulator with the flow meter is used, first open the needle valve outlet on the flow meter. Then open cylinder valve fully, after which the needle valve is closed.

   Cylinder pressure is automatically reduced so that the flow of gas is controlled by the needle valve on the outlet. This valve regulates the volume of gas delivered to the patient.
3. Attach the long rubber tubing on the mask to the outlet on the back of the flow meter.
4. Have patient exhale and apply mask to his face. Adjust head band so that it fits snugly.
5. Adjust the needle valve outlet to deliver the prescribed flow of gas. The gas, after passing through the reducing valve and flow meter is delivered through the tubing to the lower end of the reservoir rebreathing bag. It passes up into the nose chamber and is inhaled by the patient. The exhaled air passes down through the tube (the one leading from mask) into the reservoir bag.
   When the bag becomes distended with the mixture of expired air and the incoming gas, the pressure thus produced causes the remaining portion of the exhaled gases to pass out through valves on the down tube of the mask.
   The breathing bag should collapse at the depth of each inspiration except when concentrations of 100% oxygen are being used.
6. If the mask is equipped with metal connecting-regulatory devices, oxygen concentrations are controlled by opening and closing the portholes and adjusting the liter flow. (2 portholes open, 4 liters, approximately 50–60% concentration.)

   The required liter flow will vary with the pulmonary ventilation of each patient.

   If mask is equipped with sponge rubber discs (inserted on either side of the tube leading from mask to breathing bag) oxygen concentrations are controlled by adjusting the liter flow only. (4 liters—40–50%; 6 liters—50–60%; 8 liters—90–95%.)

   When the sponge valves become moist they should be removed and dried by compressing them in a towel.

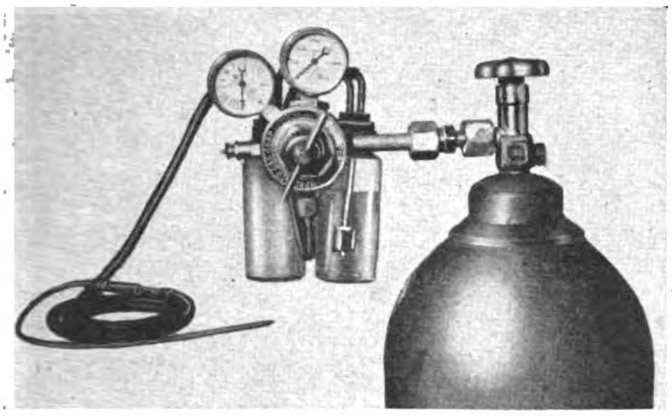
C. Procedure (When Oxygen-Helium Mixture is Used)

1. The flow of helium 80%—oxygen 20% is adjusted according to the respiratory minute-volume of the individual patient.
2. The flow meter is adjusted so that gas is supplied to the inhalation apparatus in such quantities that the rebreathing bag is not quite emptied with each respiration.
3. Within 2 to 4 hours after treatment has been instituted, the respiratory volume of most patients is usually reduced, with 6–8 liters per minute as an average.
4. When oxygen-helium mixture is being administered, the patient's voice becomes high and somewhat nasal in quality.
   As long as the flow meter is set properly, the rebreathing bag moves freely with each inspiration, and the voice continues to have a changed quality, the apparatus may be considered as operating efficiently.

D. Care of Equipment

1. Wash mask, rebreathing bag and tubing with soap and water. Rinse thoroughly and allow to dry.
2. Return regulator, BLB mask and attachments to the Centralized Matériel Section.

OXYGEN ADMINISTERED BY NASAL CATHETER TECHNIQUE



Nasal Oxygen Equipment Assembled

Equipment

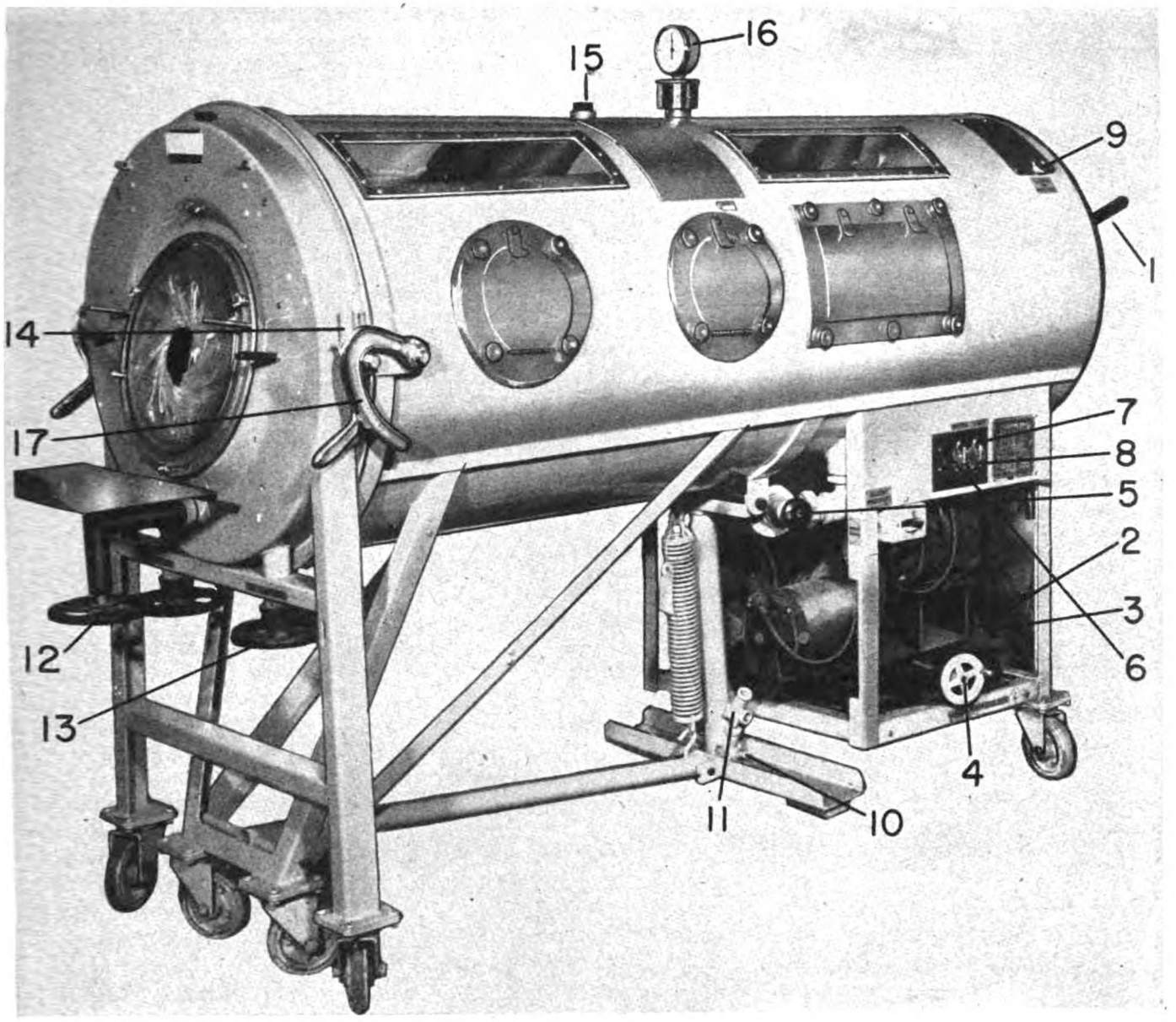
Catheter, French, No. 10 or 12 (with multiple holes).
Oxygen and regulator.
Cylinder strap.
Rubber tubing 4′.
Glass connection tube.
Adhesive tape.
Mineral oil.
Safety pin, large.

METHOD	IMPORTANT POINTS
A. Procedure	
1. Strap cylinder to side of bed. Attach the regulator, humidifier and tubing to the cylinder. Test the apparatus.	
2. Determine the approximate depth to which catheter is to be inserted by measuring the distance from the external naries to the tragus of the ear. Mark distance on catheter.	
3. Lubricate catheter sparingly, taking precautions that discharge holes are not obstructed. Connect the catheter to the long tubing connected to the regulator.	
4. Start the flow of oxygen. Adjust pressure reducing regulator to flow of 4 liters per minute.	
5. Insert catheter slowly through the nose until it can be seen through the patient's mouth opposite the uvula. It is pushed beyond this point as the patient swallows, and then, withdrawn a fraction of an inch.	Approximate alveolar oxygen concentrations obtained are: 3 liters—30%. 7 liters—40%. 10 liters—50%.
6. The pressure reducing regulator is then adjusted to maintain the concentration prescribed by the doctor.	
7. The distal portion of the catheter is brought over the forehead and anchored with adhesive strips. Pin tubing to pillow or mattress allowing patient full movement.	Insert clean catheter in alternate nostril at least every 12–18 hours.
B. Care of Equipment	
1. Disconnect regulator, humidifier, tubing, connectors and catheter. Wash bottles and tubing. Dry thoroughly and assemble parts. Boil catheter 5 minutes.	
2. Return oxygen equipment to Centralized Matériel Section.	
3. Measure oxygen remaining in tank and mark amount on tag. Secure tag on tank. Return empty cylinder to oxygen tank room.	

POSTURAL DRAINAGE

Purpose: To promote drainage from the lungs in bronchiectasis and in lung abscess.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. The duration and frequency of the treatment is ordered by the doctor.	
2. Variations in the position for drainage of pulmonary abscess will depend upon the location of the lesion in the lung.	
B. Procedure	
1. Unless otherwise ordered, instruct the patient to lie on his abdomen laterally across the bed with the head and shoulders near the floor with the forearms resting on a footstool.	The location of the abscess determines whether the patient should lie on his back, chest or side.
2. Give the patient a disposable sputum cup to use for expectoration. Instruct him to cough vigorously and frequently and to turn from side to side. Instruct him to fill sputum cup only half full and to cover the contents with several pieces of tissue.	Correct position and coughing promote the drainage of thick purulent material.
3. Wrap sputum cups in several thicknesses of paper and tie securely before disposing of them.	



RESPIRATOR

1 Handle for manual operation.
2 Rod and sleeve for manual operation.
3 Lever for manual operation.
4 Handwheel for controlling rate of respiration.
5 Handwheel for controlling depth of respiration.
6 Spare outlets for electrical appliances.
7 Motor switch.
8 Light switch.
9 Positive pressure valve
10 Release valve for tilting the respirator.
11 Socket for hydraulic jack for tilting the bed.
12 Head rest adjustment wheel.
13 Bed adjustment wheel.
14 Set-in sockets for standards.
15 Alarm bell connection.
16 Chamber pressure gauge.
17 Clamp for closing head end of respirator.

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THE RESPIRATOR

Purpose: To provide artificial respiration for prolonged periods when the respiratory muscles are paralyzed or are otherwise incapable of proper functioning.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. A respirator is inspected periodically and kept available for emergency use. An additional respirator, ready for use, is kept in the Centralized Matériel Section.	The respirator is most commonly used in paralysis of the intercostal or diaphragmatic muscles of respiration.
2. A team of 4–5 persons is required to place a patient in the respirator.	It is also used for respiratory failure due to depression of the respiratory center in the medulla as in morphine or carbon monoxide poisoning.
3. A nurse and a technician are in constant attendance with the patient in a respirator.	
4. The alarm bell for the respirator is not usually used when two persons are in constant attendance with the patient.	The first essential in artificial respiration is the maintenance of free air passages in the patient.
B. Equipment	
Respirator. Cotton. Abdominal pads. Pillow and pillowcase. 2 sheets. Wall thermometer. Suction machine. Oxygen, nasal or mask. Tracheotomy set. Bronchoscopy tray (obtain from O.R.).	
C. Preparation of the Respirator	
1. Prepare respirator and assemble equipment. Attach the electric cord to the wall socket. Turn on switch No. 7 to test the motor. Turn on light switch No. 8. Fasten ground wire clip to a suitable connection—such as a radiator.	The circuit used for the respirator must not be overloaded. The temperature within the respirator should be within the limits of 70°–75° F. and the humidity, 30–40%. Turn on switch No. 8 to increase the temperature within the chamber, as desired.
2. Release the clamps, No. 17, at the head of the chamber and pull out the carrier.	
3. Cover the mattress with a sheet.	
4. Loosen the hand nuts on the collar adjustment wheel. Adjust collar to a size that will permit the patient's head to slip through easily.	
5. Adjust the headrest to the proper height by turning handwheel No. 12.	
6. Hang the wall thermometer inside the respirator on the swinging rod at the head end.	
D. Placing the Patient in the Respirator	
1. A minimum of 4 persons must be available to place an adult patient in the respirator—3 for lifting and placing the patient on the cot and 1 for supporting the head while it is slipped through the collar. Place the patient on the mattress on his back. His head rests on a pillow on the headrest.	The upper edge of the mattress should touch the end of the chamber.
2. Place cotton around the patient's neck to prevent irritation and to help seal the air in the chamber. Relieve any pressure on the shoulders with cotton or abdominal pads.	The patient's shoulders should be against the end of the chamber.
3. Adjust the collar snugly but not too tightly by turning the collar adjustment wheel and by tightening the hand nuts.	The patient's head should be approximately in the center of the the head hole.
4. Adjust height of headrest by turning handwheel No. 12.	

5. Adjust the height of the bed with handwheel No. 13.
6. Place the arms in a comfortable position and cover the patient lightly with a sheet. Remove all clothing.
7. If possible, condition the patient to the respirator before sealing him in the chamber. Turn on motor and repeat "in—out" until the patient's breathing is synchronized with the rate of the respiration.
8. Roll the carrier into the chamber and fasten clamps, No. 17, securely.

Watch the patient's arms when the carrier is rolled into the chamber.

9. Positive pressure valve No. 9 always remains open unless otherwise ordered by the doctor.

E. Operation of the Respirator

1. The current is turned on and the rate and depth of respiration are adjusted according to the doctor's orders.

   The rate of respiration is increased by turning handwheel No. 4 to the right and decreased by turning it to the left. Check respiration rate frequently by counting the movements per minute of the bellows.

   The depth of respiration is increased by turning handwheel No. 5 to the right and decreased by turning it to the left.

The treatment is ordinarily started with a negative pressure rate of 15–20 per minute for adults, 20–30 per minute for children and 40–45 per minute for the newborn.

Pressure within the body is the same as atmospheric pressure. As air pressures tend to equalize themselves, the period of subatmospheric air pressure within the respirator expands the lungs and the patient inhales. The period of atmospheric pressure compresses the lungs and the patient exhales.

2. Observe the chamber pressure gauge No. 16 frequently as the amount of negative pressure within the respirator is registered on it.
3. Encourage the patient to relax and not to attempt to breath in opposition to the respirator.
4. Use the portholes at the side of the respirator to administer to the needs of the patient as necessary. Work quickly as possible. Open portholes at expiration periods in order to reduce to a minimum any interference with the patient's breathing. Always close portholes immediately after use.
5. Standards are attached to head plates at set-in socket No. 14 for the administration of intravenous fluids or gavage feedings. The tubing is passed through the plugged hole in the head plate.
6. To tilt the bed laterally:

   Turn adjustment wheel No. 13. Hold and turn the patient's head while tilting the bed.

7. To raise the foot end of the respirator:

   Fit the slit end of the hydraulic jack over release valve No. 10 and turn clockwise to close the valve. Insert jack handle in socket No. 11 and pump up and down slowly to elevate the machine.

   To return the respirator to the horizontal position, turn release valve No. 10 very gradually to the left so that the patient will not be jarred when the respirator touches the floor.

   Drainage of mucus into the throat makes it possible to aspirate it more effectively.

Trendelenberg position is used for postural drainage. The respirator should be tilted until the head is approximately 20° lower than the feet.

8. To operate the respirator manually:

   Manual operation is necessary when the electric current fails or a defect in the mechanism occurs. Push down lever No. 3 at lower end of the respirator so that the rod and sleeve slide freely. Close valve No. 5 during hand operations.

   Stand close to the foot end of the machine, grasp the handle with both hands and sway alternately forward and backward at the rate of respirations per minute prescribed for the

The hand operator needs relief every 5–10 minutes.

All ward personnel should be thoroughly instructed in the manual operation of the machine.

patient. Observe pressure gauge to determine whether sufficient pressure is being maintained. To readjust the machine for motor operation, turn lever No. 3 back to original position and move handle No. 1 until catch engages. Open valve No. 5.

9. To adjust the machine for positive pressure:
   When positive pressure is required, valve No. 9 is turned down to the desired point.

Positive pressure is greater than atmospheric pressure. It is used only when the body needs assistance in expiration. Too much hyperventilation can result in emphysema, massive atelectasis or pulmonary pneumonia or disturbance of acid-base balance.

F. Care of the Patient in the Respirator

1. The patient is removed from the respirator only if so ordered by the doctor and only when an adequate team is available to care for him quickly and effectively.
2. Bathing the patient:
   If 2 nurses are available, place the bath equipment inside the respirator between the patient's legs. Work from opposite sides, one nurse using the upper 2 portholes the other the lower 2 portholes. Assist each other in handing equipment back and forth.

   All equipment must be in readiness before the bath is begun. Work quickly as the negative pressure is reduced when the portholes are in use.

   If 1 nurse gives the bath, place the bath equipment on a stand by the respirator close to the bedpan porthole.
   Keep one arm inside the respirator all the time to minimize the disturbance of pressure within the chamber.
   Move the stand to the opposite side of the respirator when ready to bathe the other side of the patient.

   The patient should rest between the two steps of the procedure. The patient's head and body should always be turned in the same direction at the same time.

   Assistant is needed for bathing the back. The helper places one hand in the porthole and uses her other hand for turning the patient's neck. The patient is gently turned away from the nurse.
3. Care of the patient's skin:
   Keep the skin clean and dry. Avoid excessive use of soap.
   Remove cotton from around the neck at least every 4 hours.
   Wash, dry and powder the neck.
   Keep the sheet free from wrinkles and relieve pressure on bony prominences. Do not allow skin surfaces to come in contact.
4. Position of the patient:
   Change the patient's position by turning slightly on his side. Support with pillows. One nurse turns the head while the other turns the body.

   Change in position aids in preventing renal complications and hypostatic pneumonia.

   Change the position at least every 2 hours.
   Lateral tipping of the cot or tilting the foot end of the respirator is done as ordered.
5. Feeding the patient:
   To lessen the danger of aspirating food or fluids, teach the patient to swallow on expiration.

   Have aspiration equipment within reach, while feeding the patient.

   Feed slowly in small amounts and at frequent intervals.
   If the patient is unable to swallow he is fed by gavage.
   The patient should have an adequate fluid intake.

   Fluids in considerable amounts are a prophylaxis against renal calculosis which is one of the complications of these patients.

   Wear a mask when feeding or working over the patient as all precautions must be taken against the patient acquiring an upper respiratory infection.
6. Elimination from bowels and bladder:
   The patient's bowels and kidneys must be adequately and regularly evacuated.
   To give an enema, (1) either place the can on the outside of the respirator and pass the tubing through a porthole or (2)

give the enema inside the respirator with a pitcher and funnel. To catheterize the patient, place all equipment inside the chamber. When the catheterization is completed, remove rubber gloves before withdrawing hands from the chamber.

7. Comfort measures:

In hot weather, the temperature may be reduced within the respirator by placing sheets dampened with cold water over the exterior of the chamber.

Special mouth care is essential for the patient's comfort and hygiene.

Provide proper recreation and diversion for the patient as his condition improves.

Place a light covering over the patient's eyes during rest periods. Allow and provide for rest and sleep by the patient as much as possible. Patient care chould be given quickly and quietly. The room should be kept quiet between activities.

8. Removing the patient from the respirator:

Accustom the patient for removal from the respirator by first turning off the motor for short, guarded intervals without removing him from the machine.

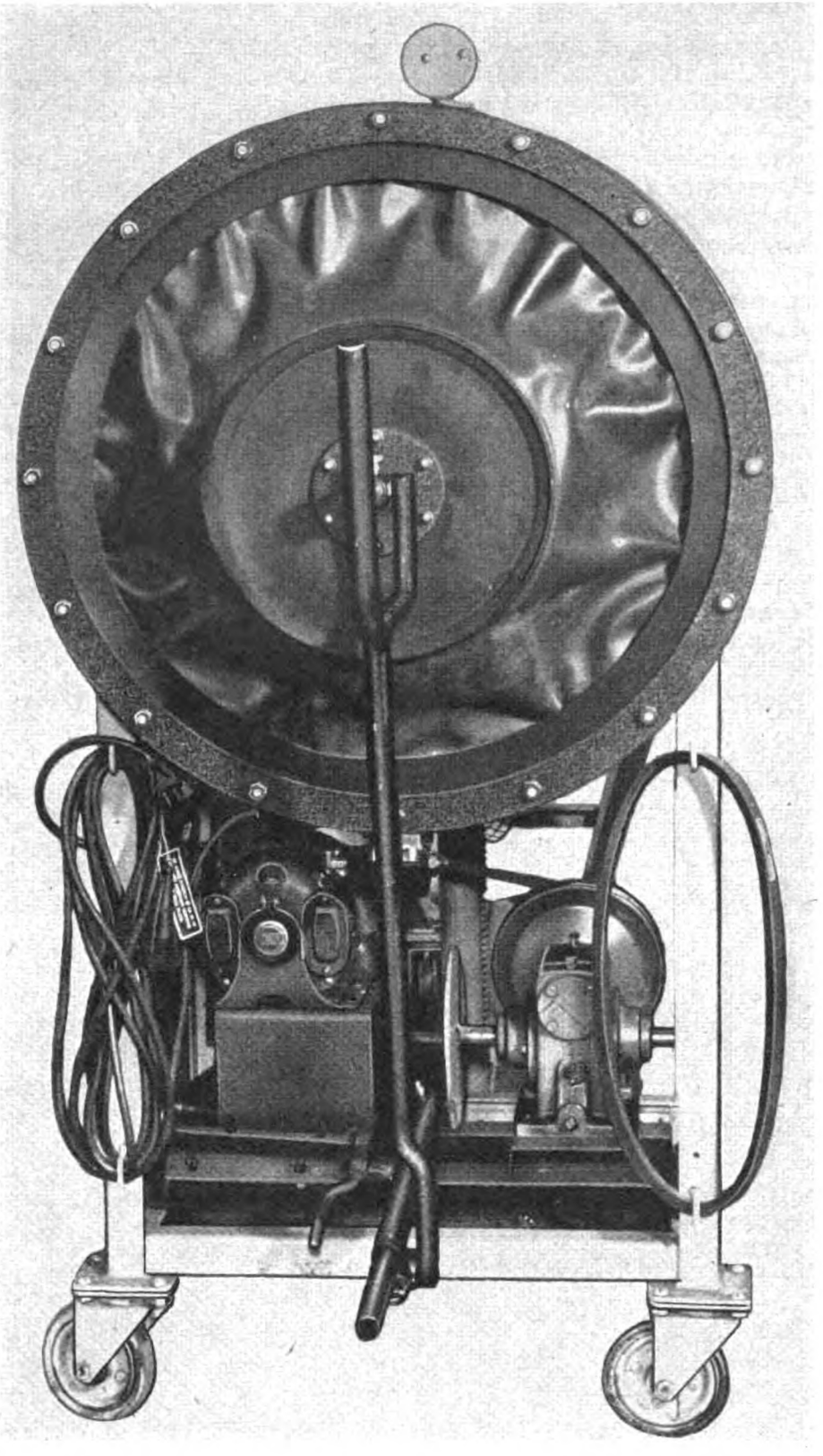
When the patient can be removed from the respirator for 2 or 3 minutes for nursing care, have all equipment in readiness before turning off the motor. Each member of the team should have specific instructions as to which activities he is to perform.

Work quickly and quietly.

One nurse should stand at the head of the respirator and carefully watch the patient as he may be unable to inform the working team that he needs to go back in the respirator.

When the patient is removed from the respirator he is apt to experience panic. The presence and encouragement of the nurse is essential.

As the respiratory muscles recover, the patient is removed from the respirator for gradually increasing periods.



Foot end of the respirator showing bellows and handle for manual operation.

SITZ BATH

Purpose: To apply moist heat for the local relief of pain and to promote healing after rectal surgery or to relieve congestion in the pelvic viscera.

METHOD

A. Equipment

1 rubber ring.
2 bath towels.
1 face towel.
Bath or sitz tub.
Bath thermometer.
Bathrobe and slippers.
Washcloth.

B. Procedure

1. Fill the tub with 6–8 inches of water or to the crest of the ilium. The temperature of the water is 92°–110° F., unless ordered otherwise.
2. Instruct the patient to sit in the bath tub on the rubber ring with legs flexed. Place the bath towel around his shoulders.
3. Check the temperature of the water every 5 minutes. Add hot water gradually as needed.
4. The patient remains in the tub 5–20 minutes as prescribed by the doctor. Assist the patient in and out of the tub as necessary.

C. Care of Equipment

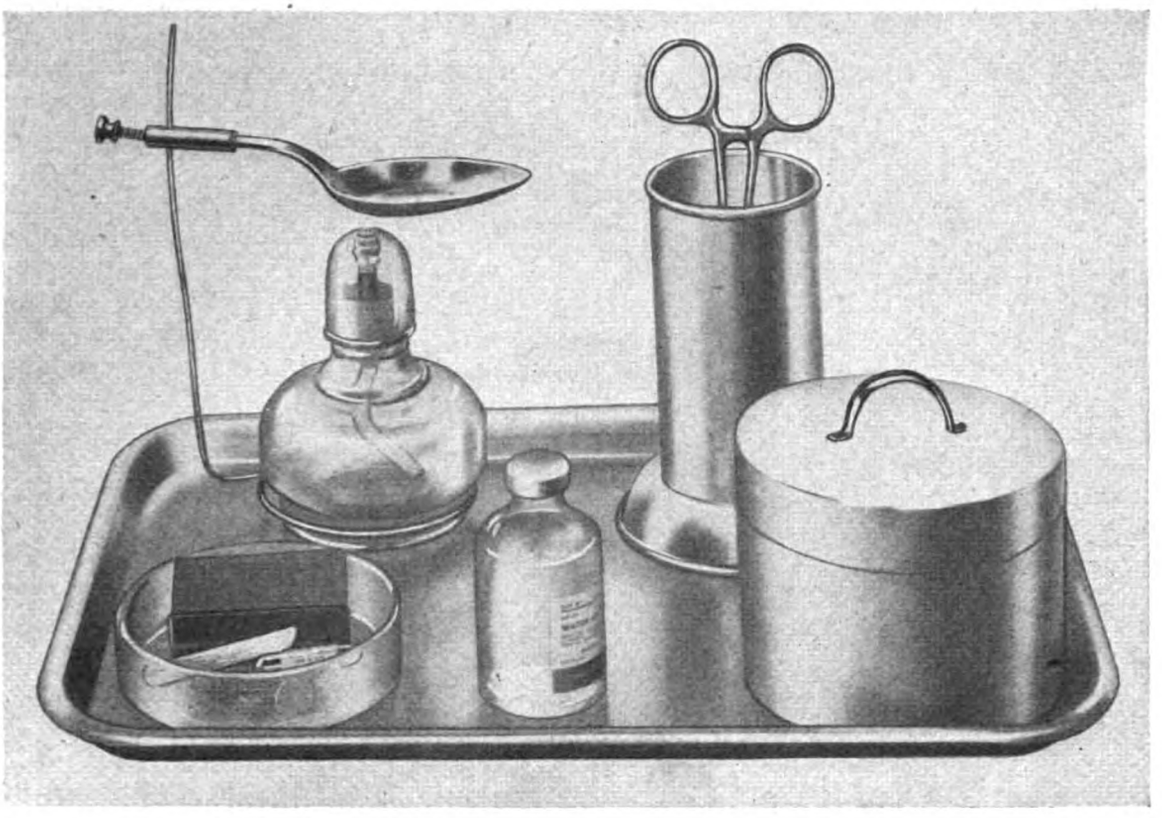
1. Scour the tub.
2. Wash rubber ring with soap and water, expel air and hang to dry.

IMPORTANT POINTS

The temperature of the water and the duration of the bath are contingent upon the therapeutic effects desired.

Pelvic congestion is relieved by dilation and relaxation of the superficial blood vessels, thereby, decreasing the blood supply to the internal organs.

Pain and swelling following rectal surgery are relieved by the local application of moist heat. This increases the blood supply to the part which in turn hastens the absorption of inflammatory products.



STANDARD HYPODERMIC TRAY*

A. Equipment

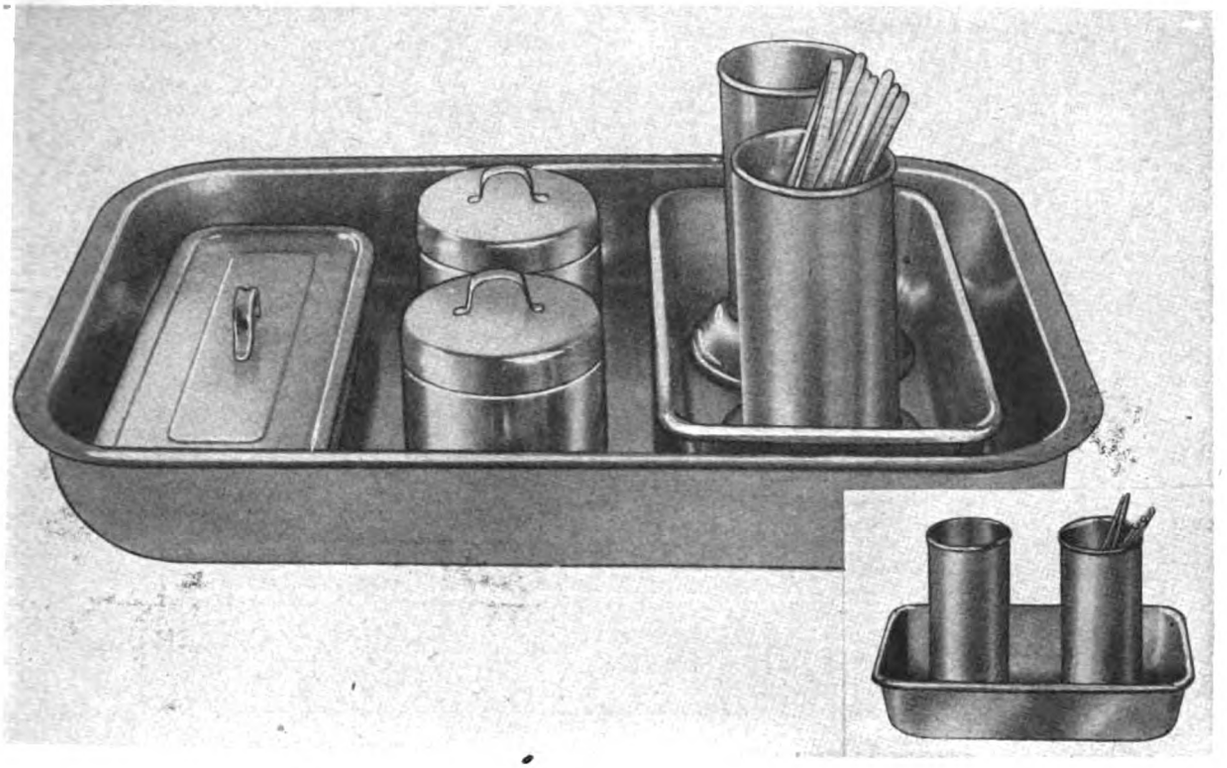
Tray, 8″ x 10″ x ¾″, with the following articles:

1 holder with forceps in zephiran chloride 1:1000 (antirust added).
1 container, covered, with cotton balls, saturated with antiseptic wash 70%.
1 alcohol lamp (denatured alcohol).
1 spoon.
1 vial distilled water.
Petri dish with the following:
Ampoules of caffeine sodium benzoate, coramine and adrenalin.
File.
Matches.

B. Care of Equipment

1. Clean tray after each use.
2. Boil forceps and container and replenish supplies daily.

*The standard hypodermic tray will be set up and maintained by the ward.



STANDARD ORAL THERMOMETER TRAY*

A. Equipment

Tray, 15″ x 9″ x 2″, with the following articles:

1 tray, 8″ x 5″ x 2″ (to carry to bedside).
1 holder, labeled "Clean".
1 holder, labeled "Used" (⅔ filled with water).
Basin, oblong, covered (⅔ filled with tr. zephiran chloride 1:1000 tinted).
1 container, small, covered, with paper wipes.
1 container, small, covered, with 2″ x 2″ gauze squares (saturated with soap solution).
Thermometers.

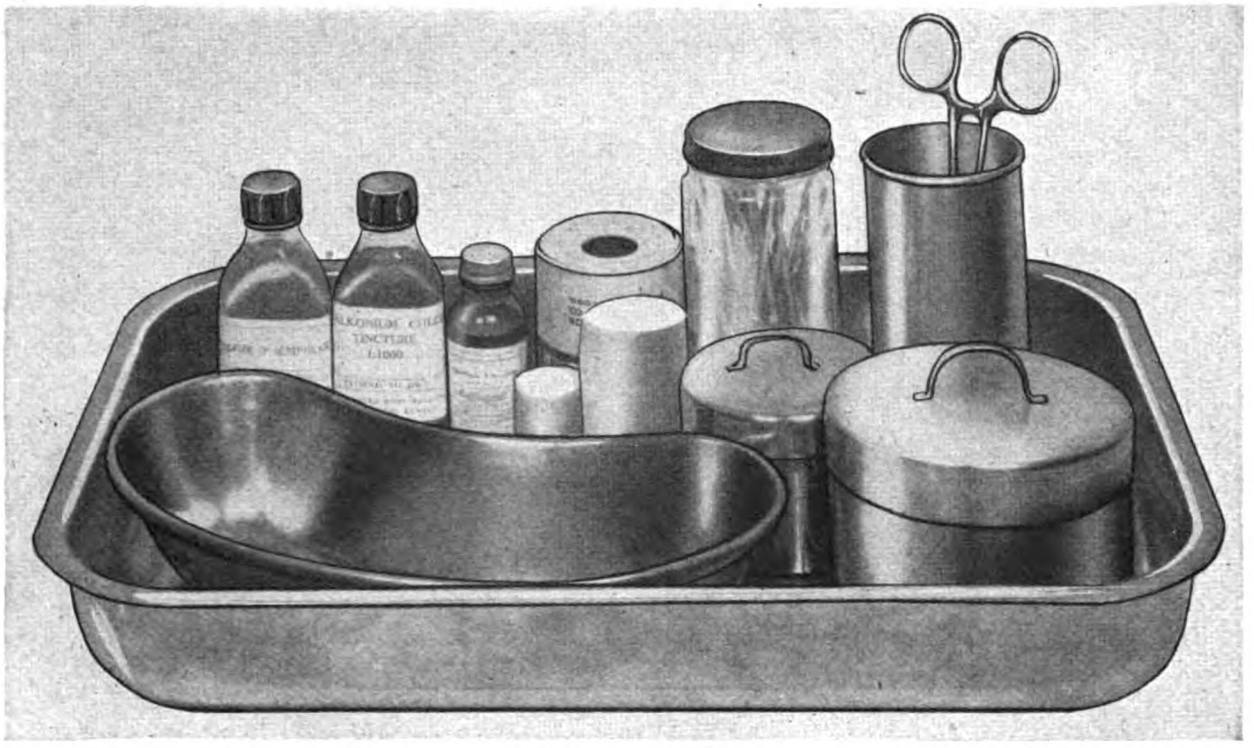
B. Care of Equipment

1. Remove contaminated thermometers from the "Used" holder.
2. Cleanse thermometers with gauze square saturated with soap solution. Rinse under running water.
3. Place thermometers in basin of zephiran solution for 5 minutes.
4. Wash and dry thermometer holders. Place layer of cotton in the bottom of each.
5. Remove thermometers from zephiran solution, rinse under running cold water and dry.
6. Shake down thermometers and return to "Clean" holder.
7. Return small tray with holders to proper space on large tray.
8. Boil all containers on thermometer tray and change the zephiran solution once daily.

*Standard rectal thermometer tray is the same as the oral tray with the following exceptions:

Rectal thermometers, pear-shaped bulb.
Tube of lubricant jelly.
All containers are labeled "Rectal" in black paint.

Individual thermometer technique (rectal) is used on wards where there is no need for a rectal thermometer tray. The thermometer is kept in a container of zephiran at the patient's bedside for the period a rectal temperature is required.



STANDARD SKIN PREPARATION TRAY*

A. Equipment

Tray, 15″ x 9″ x 2″, with the following articles:

- Zephiran chloride solution, 1:1000, 60 cc.
- Tr. merthiolate, 1:1000, 60 cc.
- Collodion, 30 cc.
- 1 container, covered, with cotton balls saturated in antiseptic wash 70%.
- 1 container, covered, gauze squares, 2″ x 2″ (unsterile).
- 1 container, with sterile applicators.
- 1 holder with forceps in zephiran chloride 1:1000 (antirust added).
- Bandage, gauze, 2″ and 3″.
- Adhesive tape.
- 1 basin, curved.

Equipment to be added for specific purposes as needed:

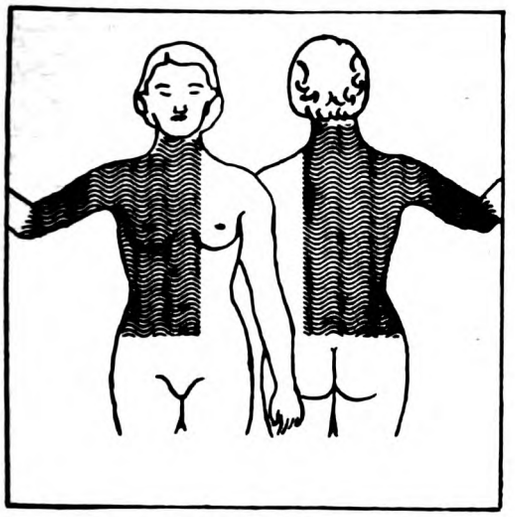
- Small rubber sheet and towel.
- Arm board.
- Tourniquet.
- Safety razor and blades.

B. Care of Equipment

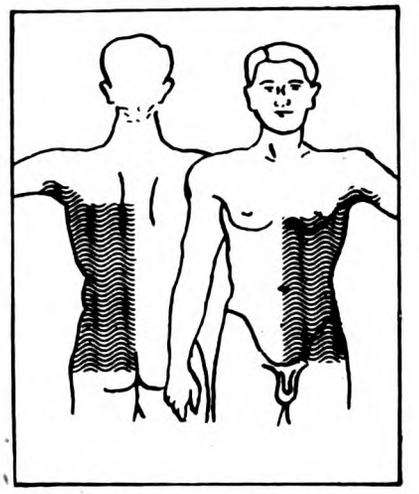
1. Clean tray after each use. Remove extra equipment and return to proper place.
2. Boil forceps and container and replenish supplies daily.

*The standard skin preparation tray, with items as listed above, will be set up and maintained by the ward as a basic tray for general use.

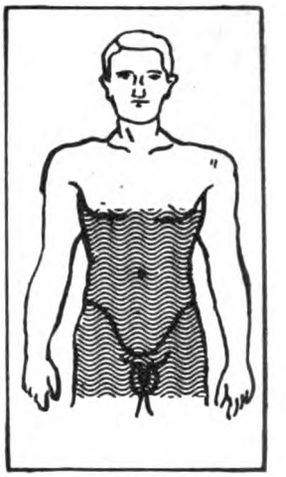
AREAS FOR SURGICAL SKIN PREPARATION



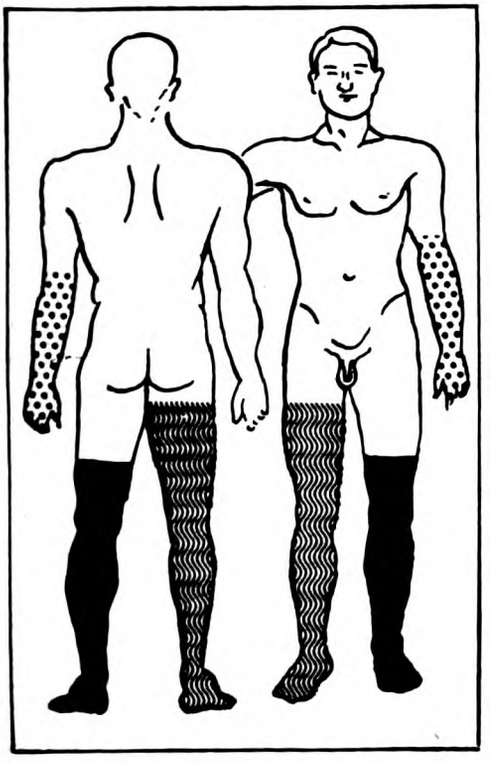
RADICAL MASTECTOMY



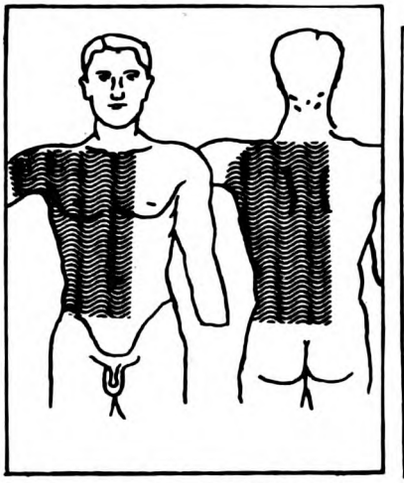
RENAL SURGERY



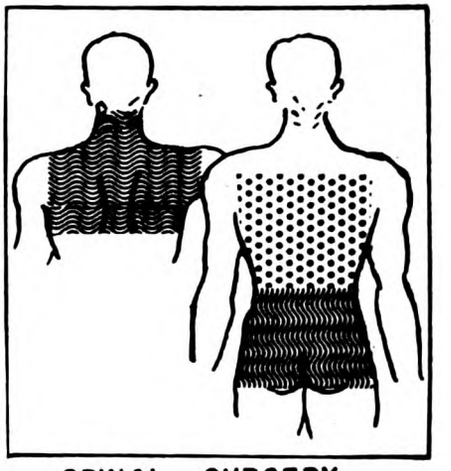
ABDOMINAL SURGERY



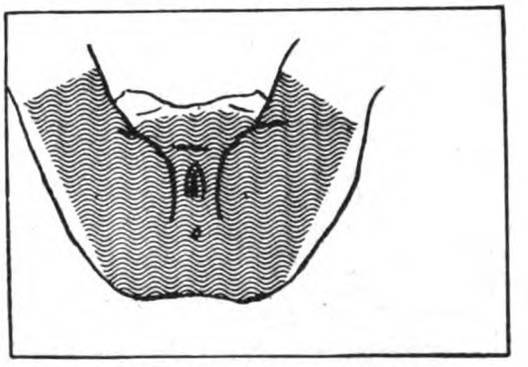
SURGERY OF THE EXTREMITIES



THORACIC SURGERY



SPINAL SURGERY



PERINEAL AND RECTAL SURGERY

SURGICAL SKIN PREPARATION

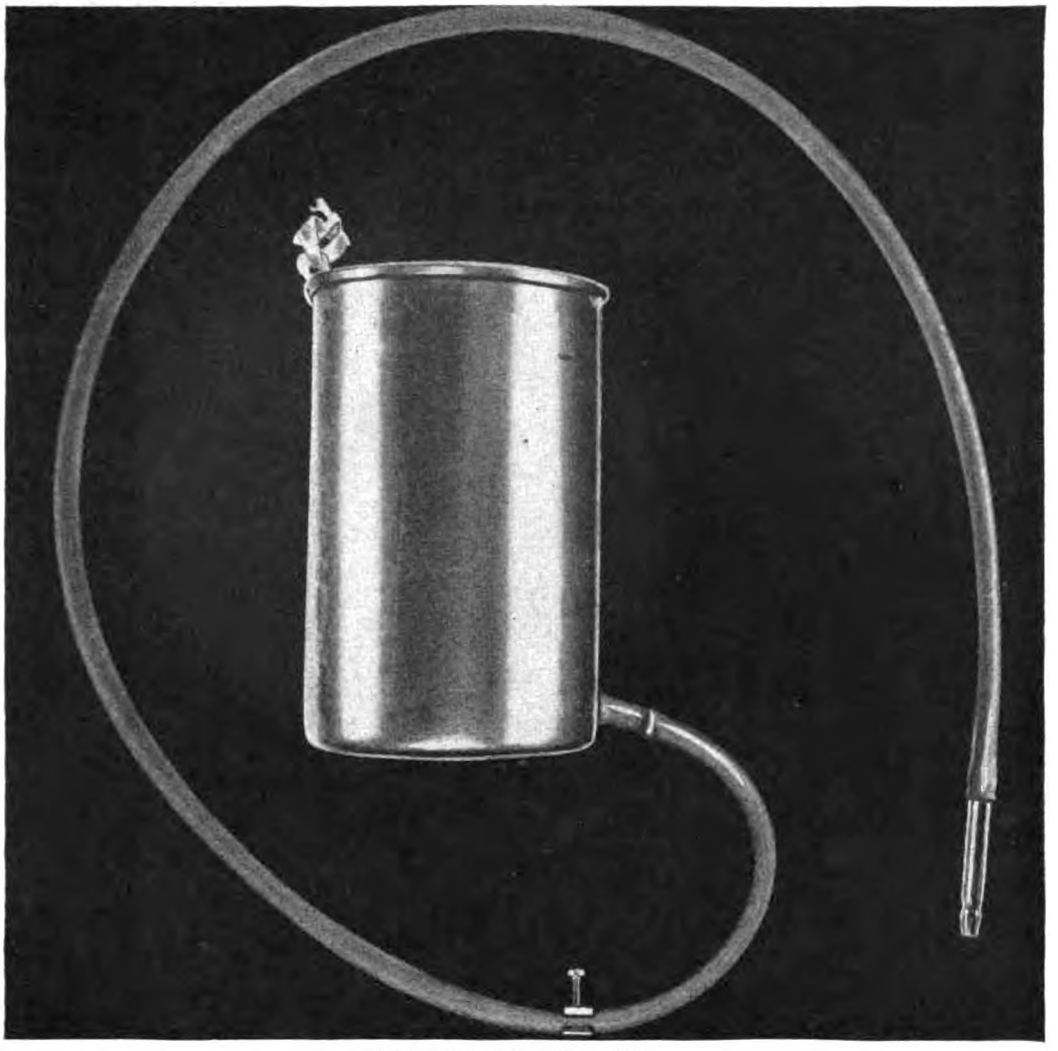
Purpose: To prepare the skin for surgery by shaving and thorough cleansing.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. Consult the doctor if there is any question about the area to be prepared.	
2. Report the presence of any skin eruptions or lesions.	
3. Special preparations are required for orthopedic surgery: 24-hour preparations—send the patient to the Cast Room for the preparation. The patient is returned to the ward with sterile stockinette applied over the prepared area. The stockinette is to be kept clean and dry for removal in the operating room. 48-hour preparations—begin the preparation on the ward with a 10-minute phisohex skin scrub 48 hours prior to surgery. Send the patient to the Cast Room for the 24-hour preparation as above.	
B. Equipment	
Tray containing: Phisohex — Applicators Safety razor — Fluffs, gauze Razor blades — Bowl, solution Basin, curved — Rubber sheet and towel Light	
C. Procedure	
1. Have the area well-lighted.	
2. Remove any adhesive marks with ether.	Avoid scratching the patient as scratches are potential sites of infection and may require the operation to be postponed.
3. Trim and clean toenails or fingernails and thoroughly clean umbilicus if they are part of the area being prepared.	
4. Apply phisohex to the area with a wet fluff and rub until a lather is developed.	
5. Shave the area closely removing all hair.	Use a new razor blade for each shaving.
6. Remove the phisohex lather and rinse skin with clear warm water.	
7. Repeat the phisohex scrub for 2–4 minutes. Remove the lather, rinse and blot dry.	

PREOPERATIVE PREPARATION OF THE PATIENT

Purpose: To prepare the patient physically and psychologically for surgery.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. Consent for the operation is obtained on Authorization for Anesthesia, Operation, Etc., Standard Form 522. The signature is witnessed. The signature of the person authorized to consent for the patient is obtained when the patient is under the legal age or unable to affix his signature.	
2. Anesthesia, Standard Form 517, signed by the examiner, is sent with the patient's clinical record to the operating room.	
3. Review the clinical record for:	
W. B. C. R. B. C. Differential count Hemoglobin Bleeding time Coagulation time Urinalysis — To have been done within 7 days prior to operation.	
Chest X-ray — Within 30 days.	
4. Preoperative orders are written by the anesthetist.	
B. Procedure	
Day prior to surgery:	
1. Instruct patient to place jewelry and valuables in the hospital safe or to give them to relatives.	Valuables are not to be kept by ward personnel.
2. Prepare the operative site as ordered.	
3. Check the preoperative orders. Administration of enemas, food, fluids, and medications are as ordered.	The intestines and bladder must be empty when the patient is under the influence of anesthesia to preclude the possibility of involuntary discharge of the contents. Accidental incision may also occur if the organs are distended.
Day of surgery:	
1. Give the morning care and bath if the patient is unable to perform it himself.	
2. The mouth and teeth must be throughly cleaned.	
3. Remove false teeth and prostheses. Remove hairpins, combs, nail polish, and lipstick.	
4. Place adhesive tape around the wedding ring if the patient desires to wear it.	
5. The temperature, pulse and respirations are measured and recorded. Any elevation of temperature and any sneezing, snuffling or coughing must be reported immediately to the doctor.	
6. Medications as prescribed are given.	
7. The patient should wear the hospital gown. Do not allow the patient to wear any silk or nylon clothing to the operating room.	
8. Have the patient void immediately before being sent to the operating room.	
9. Assist the operating room technician in placing the patient on the stretcher.	The nurse should be with the patient when he leaves for the operating room.
10. The clinical record is sent to the operating room with the patient.	



Throat Irrigating Set

THROAT IRRIGATION

Purpose: To cleanse, relieve pain, and reduce inflammation and congestion of the mucous membranes of the throat.

A. Equipment

Sterile throat irrigating set:

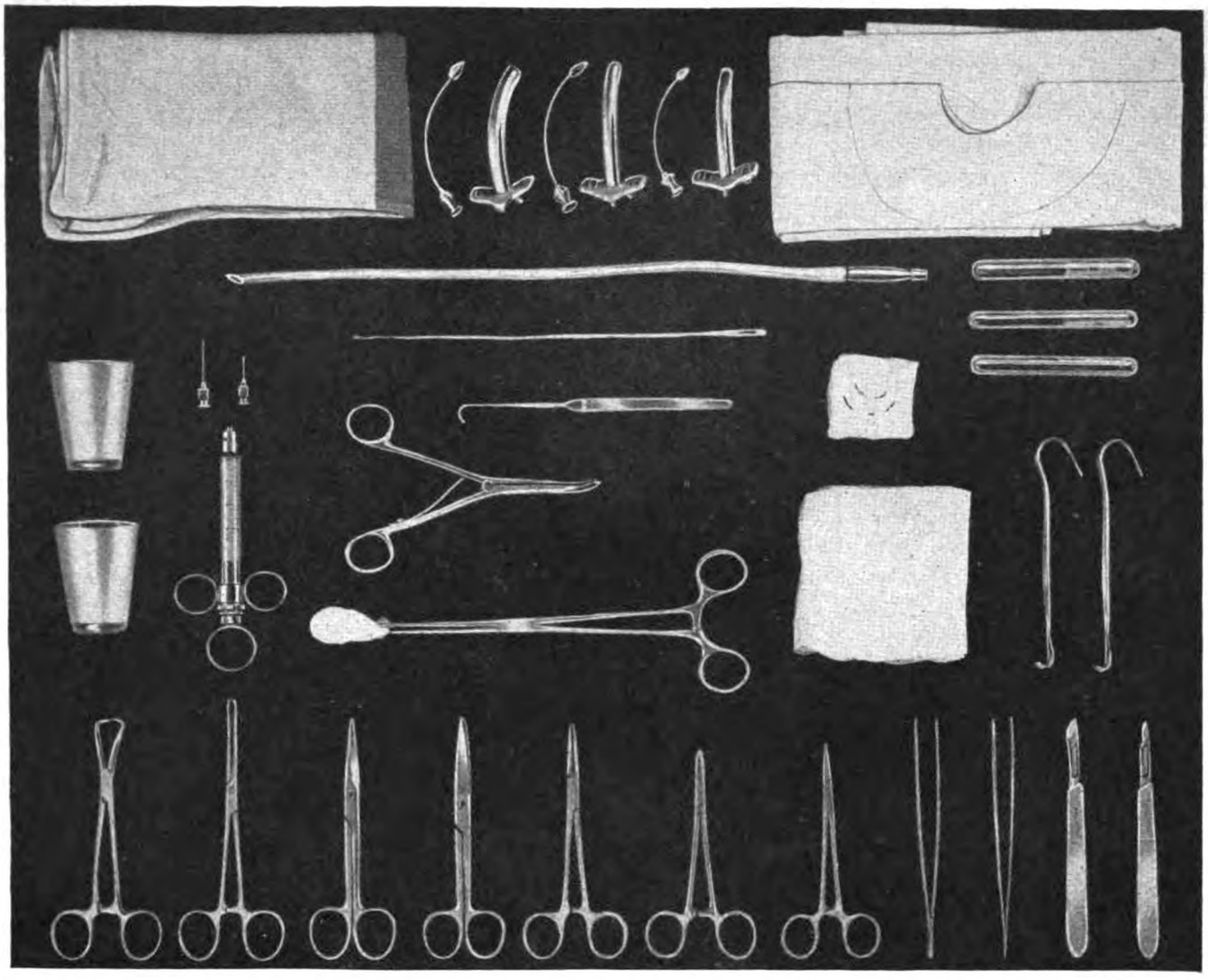
- Irrigating can
- Rubber tubing
- Glass connection tube
- Clamp
- Prescribed solution, 110–118° F.
- Small rubber sheet
- Hand towel

B. Treatment

1. Throat irrigations should be given before meals to prevent vomiting.
2. Prepare the prescribed solution in the irrigating can. Hang can on the standard at the level of the patient's head.
3. Patient should be in sitting position if possible. Place rubber sheet and towel around chest and shoulder. Instruct patient to hold curved basin under chin to catch return flow. If the patient is unable to sit upright place him on his side with head turned to allow free return of solution.
4. Patient will insert the glass tube into his mouth directing the flow of fluid first on one side of the throat and then the other. Continue until all the solution is used.
5. Record in nurses' notes: Type and amount of the solution and character of return flow.

C. Care of Equipment

1. Wash irrigation equipment in soap and water.
2. Wrap and return to Centralized Matériel Section.



TRACHEOTOMY TRAY

4 towel clips.
2 forceps, Allis.
1 scissors, Mayo, curved.
1 scissors, suture.
1 forceps, Kelly, curved, 5½″.
1 needle holder, small.
6 forceps, mosquito, 5″.
1 forceps, tissue, smooth.
1 forceps, tissue, mouse tooth.
1 knife handle, with No. 10 blade.
1 knife handle, with No. 15 blade.
2 medicine glasses.
1 syringe, Luer-Lok, 3 cc.
1 needle, hypodermic, 22 G, 1″.
1 needle, hypodermic, 26 G, ½″.
1 forceps, sponge, 9″ with sponge.
1 dilator, tracheal.
1 retractor, tracheal, hook.
1 probe, straight, 8″.
2 catheters, French, No. 14 and 16 cut at 75° and glass connector.
10 sponges, gauze, 4″ x 4″
1 needle, suture, curved, cutting, No. 12.
1 needle, suture, curved, cutting, No. 18.
2 retractors, tracheal, Hupp.
1 suture, catgut, tube, plain, O.
1 suture, catgut, tube, plain, OO
1 suture, black silk, tube, 3–0
3 towels.
3 tubes, trachea, silver, No. 4, No. 5, No. 6.
1 biopsy sheet, large.

SUPPLIED BY WARD

Skin preparation tray.
Sterile gloves.
Procaine solution, 1%.

CARE OF THE TRACHEOTOMY PATIENT

Purpose: To maintain free passage of air through an artificial airway into the trachea.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. Following surgery, the patient is usually taken to the recovery ward for the first 24 hours.	A tracheotomy is performed when there is obstruction of the air passage into the larynx from any cause.
2. The patient must be under constant observation for at least 48 hours.	
3. All equipment for routine and emergency use should be accessible at the patient's bedside.	
4. Should the outer tube become displaced, the edges of the incision are held apart with a Kelly forceps until the doctor arrives.	
5. Feeding tubes are not usually used in tracheotomy cases. They are always used in laryngectomy cases.	
6. Reassure the patient especially during the first postoperative night. He has real fear that he will die of asphyxiation should he go to sleep. Temporary loss of voice and breathing by means of a tube in the trachea are distressing to him.	
B. Equipment	
Tracheotomy tray for emergency use. Kelly forceps in sterile towel. Duplicate sterile tracheotomy tubes with obturator. Cotton tape. Sponges, gauze, 4″ x 4″. Flask of normal saline solution. Hydrogen peroxide. Steam inhalator. Suction machine and catheter. Oxygen tank with regulator and nasal catheter. Pencil and paper.	The tracheotomy tubes in the emergency tray must correspond in size with the tubes in the patient.
C. Care of the Patient Following Tracheotomy	
1. The patient usually lies in Fowler's position.	
2. Examine the tracheotomy tube at frequent intervals to ascertain if the inner tube is locked in place. The ties holding the outer cannula should be tied in a square knot at the back of the patient's neck.	
3. Fasten the obturator to the patient's chest with a strip of adhesive when it is not in use.	
4. Aspirate the tube frequently with the suction catheter.	Suction should be gentle to avoid injuring delicate mucous membrane.
5. Wipe away secretions carefully and quickly before they can be aspirated. Do not use cotton or cotton applicators for wiping secretions.	
6. Should respiratory difficulty occur, oxygen is introduced into the trachea by means of the nasal catheter.	Normally, a soft blowing sound is heard through the cannula.
7. Turn the patient on his side at least every 2 hours to promote aeration of the lungs and to prevent atelectasis.	
8. Watch for symptoms of complication, i. e., hemorrhage, shock, respiratory difficulties, apprehension and cyanosis.	Increasing restlessness and apprehension are indicative of anoxemia.
9. Check the blood pressure and pulse rate every half hour during the first 24 hours.	Low blood pressure and a rapid weak pulse are signs of internal hemorrhage.
10. Keep gauze moistened with normal saline solution over the opening of the tube in order to moisten inspired air and to filter out dust particles.	

11. Use the steam inhalator, if additional moisture is needed to maintain the patient's comfort.
12. Keep the room well ventilated.
    The temperature of the room should be comfortable.
13. Pencil and paper should be provided as a means of communication for the patient.
14. Record intake and output, amount and character of drainage, any significant signs and symptoms and any treatments administered.

D. To Aspirate the Tracheotomy Tube

1. Gently insert the catheter attached to the suction machine into tracheotomy tube to the depth of 5 inches. (Aspirations deeper than 5 inches are done by the doctor.)
2. Rotate the catheter gently while suctioning and remove it as soon as possible as it lessens the air intake.
3. Immerse the tip of the catheter after each use into a bowl of water, suction water through the catheter and wipe dry with a sponge.

E. To Clean the Inner Tube

1. Release the inner tube by turning the small lock at the top.
   Gently remove the inner tube and place in hydrogen peroxide to soak for 10 minutes.
   Draw a strip of gauze through the tube to dislodge any remaining adherence of mucous and rinse under running cold water. Tarnish may be removed by silver polish or bon ami.
   Boil the tube 10 minutes. Place on sterile gauze.
2. Aspirate the outer tube and replace the inner tube.

The outer tube is never removed by the nurse. Care should be taken not to dislodge the outer tube.
Handle the tube gently while cleaning to avoid denting or bending.

F. To Change the Dressing

1. Remove the soiled dressing around the tube being careful not to disturb the outer tube.
2. Clean the skin around the tube with a sterile applicator.
3. Cut a sterile 4″ x 4″ gauze sponge about 2 inches to the center on one side.
4. Slip the 4 x 4 gauze sponge around the tube with the cut end downward.
5. Change this dressing as often as necessary.

Maintain aseptic technique as this wound is easily infected.

G. To Change the Outer Tube

1. The outer tube is changed by the doctor.
2. The tape around the patient's neck is cut.
3. The complete tube is removed and the wound is cleansed.
4. The size of the new tube must correspond with the tube being replaced.
5. The tape attached to the outer tube is tied in a square knot at the back of the patient's neck.

H. To Administer Oxygen

1. The catheter is inserted into the inner tube to a depth of 1 inch. Anchor catheter to the neck with adhesive strips.
2. Do not insert the catheter beyond the tracheotomy tube as coughing reflexes will be stimulated by the tickling sensation of the oxygen.

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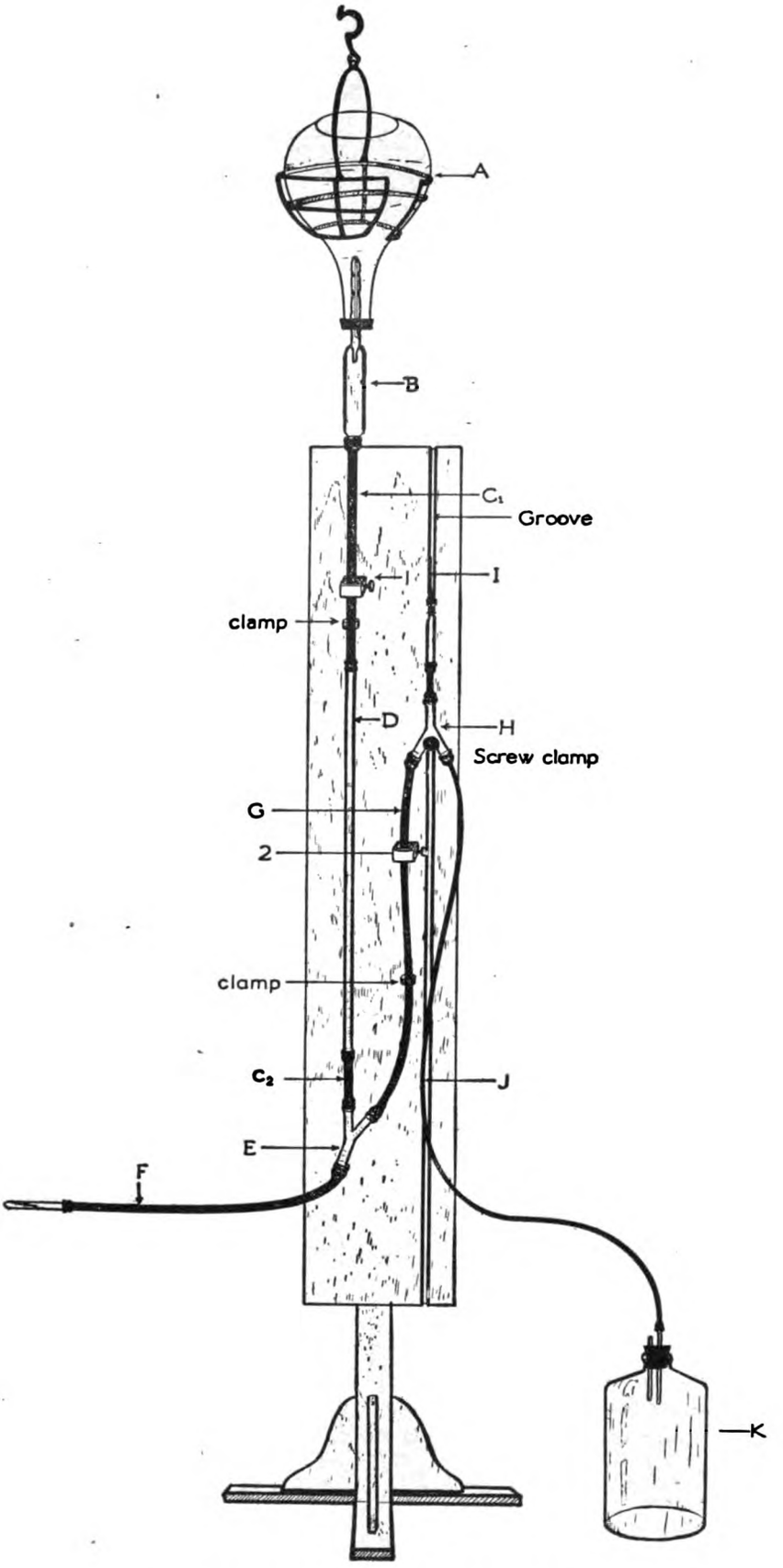


TIDAL DRAINAGE APPARATUS

TIDAL DRAINAGE OF THE URINARY BLADDER

Purpose: To develop muscular tone in the neurogenic bladder through the alternate filling of the bladder to a predetermined degree of intravesical pressure and the emptying of it by a combination of siphonage and gravity flow.

METHOD

IMPORTANT POINTS

A. Equipment

Tidal drainage apparatus (see illustration):

A—Bottle, 1,500 cc. capacity in wire carrier.
B—Vent drip.
C_1—Rubber tubing (¼" inside diameter) 10", with clamp No. 1.
C_2—Same type of tubing.
D—Glass tube, 30".
E—Glass Y-tube.
F—Rubber tubing (¼" inside diameter) 36" with glass connection tube.
G—Rubber tubing, 15" with clamp No. 2.
H—Glass Y-tube.
I—Air vent (glass adaptor with needle, 25 G.).
J—Rubber tubing (⅛" inside diameter) 30".
K—Drainage bottle, gallon size, with double hole stopper and glass tubes, 3" and 5".
1 and 2 shut-off clamps.

Catheterization tray.
Foley catheter, No. 18, G., 5 cc.
Sterile syringe, 30 cc.
Sterile solution, as ordered.
Sterile medicine glass with 30 cc. water.
Sterile gloves.
Lubricant jelly.
Adhesive tape.
Safety pin.
Kelly forceps (nonsterile).
Standard.

B. Preparation of Equipment

1. Place standard and tidal board beside the patient's bed.
2. Open the irrigation set taking precautions to keep set sterile.
3. Insert drip device, B, into stopper of irrigating bottle, A. Close clamp #1 on tubing C_1. Invert the bottle and suspend from standard.
4. Fit tubing on tidal board. Place tubing C_1 and tubing G in clamps on tidal board. Place glass Y-tube, H, over screw clamp and fit air vent, I, into the vertical groove on the board.
5. Attach drainage tube J to the glass tube in stopper of the drainage bottle K.
6. Open clamps No. 1 and No. 2 and flush solution through tidal apparatus to expel air. Cover glass tube (catheter connection) with sterile gauze until ready to use.

C. Procedure for Establishing Tidal Drainage

1. Uretheral catheterization using the Foley catheter is done by the doctor. The bladder is emptied.
2. The uretheral catheter is connected to the tidal apparatus at F.
3. The rubber tube G is then clamped off, thus converting the apparatus into a cystometer.

4. Solution from the irrigating bottle is then allowed to flow into the bladder in increments of 50 cc. Intravesical pressure is determined by watching the rise in the level of the fluid in the glass tubing D.
5. When the doctor has determined the maximum amount of fluid to be introduced into the bladder, the water level in the glass tube D is noted.
6. The glass Y-tube, H, is then fixed on the tidal board at this determined height.
7. Clamp #2 on tubing G is then released. The ideal frequency of bladder emptying is 3–4 hours. The drip device is regulated so that the above determined quantity of fluid will enter the bladder during that time. Automatic rhythmical emptying of the bladder will occur at regular intervals.

If the patient has a hypertonic bladder, his bladder capacity will be reduced and the intravesical pressure high. If the patient has a hypotonic bladder, his bladder capacity will be increased but the intravesical pressure low. The height of the Y-tube controls the amount of intravesical pressure and its position is changed only by the doctor.

D. How Tidal Drainage Functions

1. Solution drips from the irrigating bottle at the rate prescribed by the doctor.
2. The solution drips through the Y-tube, E, to catheter and into the bladder. Simultaneously, urine will be secreted and collected in the bladder. This dual filling of the bladder to the predetermined level will continue until the maximum intravesical pressure for evacuation has been reached. At this point the bladder will no longer receive the solution and it is diverted to tubing G.
3. When the fluid reaches the Y-tube, H, it begins to flow down into the drainage bottle and the bladder is drained by a combination of siphonage and drainage.
4. When the solution ceases to flow, air enters through air vent I and the siphonage system is disrupted.
   The cycle of filling begins again.

E. To Disconnect Tidal Drainage Temporarily

1. Tighten clamp on tubing C_1.
2. Disconnect catheter from glass connector. Drain urine from tubing and catheter.
3. Cover end of catheter with sterile gauze. Bend catheter on itself secure with rubber band, and fasten to thigh with adhesive strip.
4. Wrap sterile gauze around glass connection, secure with rubber band and fasten to standard.

F. Care of Tidal Drainage Apparatus

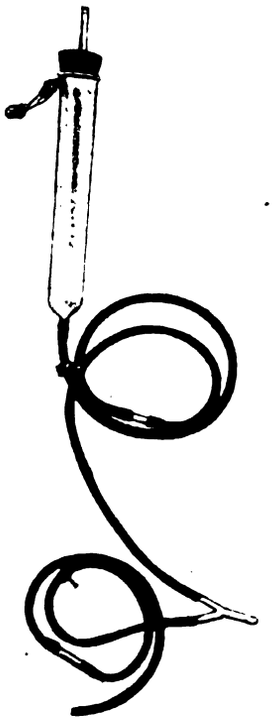
1. Inspect for effective functioning of apparatus at frequent intervals. Keep tubing free from kinks or pressure.
2. Regulate drip to prescribed rate and maintain this amount at all times. Change solution bottle before it is empty.
3. Measure solution in drainage bottle and empty every 8 hours. Wash and sterilize bottles once each day.
4. Record at the end of each eight hour period total intake, total drainage, amount of irrigating solution used and total urine (obtained by subtracting total drainage from total solution used).

The column of water in glass tube and the apex of tube H should be at the level of the symphysis at all times.

If rate of flow is maintained at 30 drops per minute, a 1,500 cc. bottle will be emptied in approximately 12 hours.

INTERMITTENT BLADDER IRRIGATION

(*Y-Irrigation Technique*)



Y-Irrigation Set

Equipment

Sterile Y-irrigation set with:
- Glass flask, graduated, 300 cc., and stopper.
- Glass Y-tube connector.
- 1 length 60″ rubber tubing (inflow tube).
- 1 length 48″ (outflow tube).
- 2 Hoffman clamps.

Solution as ordered.
Retention catheter.
Catheterization tray.
Sterile gloves.
Lubricating jelly.
Drainage bottle, gallon size.
Rubber stopper, 2-holed, with glass tubes.
Safety pin.
Standard.

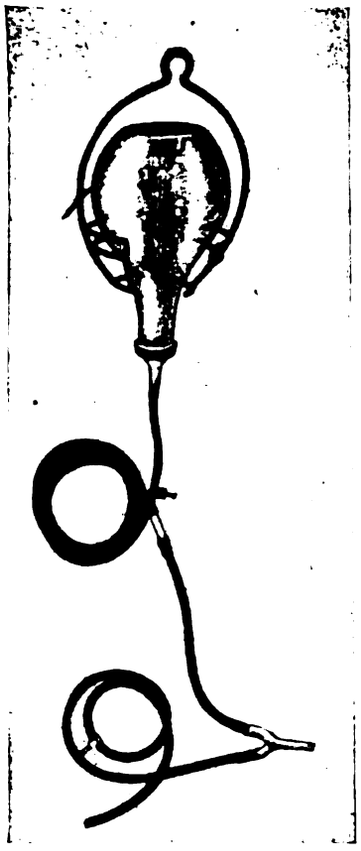
Purpose: To irrigate the urinary bladder at stated intervals for the purpose of removing mucus, pus, blood and irritating products of inflammation and urine decomposition.

METHOD	IMPORTANT POINTS
A. Preparation of Equipment	
1. Suspend flask on standard. Tighten Hoffman clamp on tubing about 6 inches below flask.	Use aseptic technique throughout procedure.
2. Connect the free end of the outflow tubing to the glass tube in the stopper of the drainage bottle.	
3. Fill the flask to the 300 cc. mark with the prescribed solution.	
4. Release clamps and expel the air from the irrigating set. Then close clamps on both inflow and outflow tubes.	
B. Procedure	
1. The doctor will insert the retention catheter and connect the irrigating set.	
2. Adjust the standard so that the lower end of the flask is not more than 8 inches above the level of the bladder.	
3. To irrigate the bladder, close the clamp on the outflow tube and open the clamp on the inflow tube. Allow the prescribed amount of solution to flow slowly through the tubing and catheter into the bladder.	
Close the clamp on the inflow tube. Allow the solution to remain in the bladder 1 minute.	The catheter acts as a siphon to empty the bladder. A fluid will flow in a siphon in the direction of the least pressure.
Open the clamp on the outflow tube in order that the return solution may flow into the drainage bottle.	
4. Repeat procedure until the solution returns clear.	

5. In the intervals between the irrigations the clamp on the outflow tube must be left open so that the bladder will drain.
   Loop rubber tubing on bed and secure with safety pin. The stopper should be replaced after each irrigation so that the sterility of the flask is preserved.
6. Record urine output on nurses' notes at the end of each 8-hour period. Compute the urinary output by subtracting the total amount of irrigating solution used from the total amount of solution in the drainage bottle.

C. Care of Equipment

1. Soak articles in warm water and Soilex solution for 20 minutes.
2. Rinse in cold running water and dry.
3. Return tray to Centralized Matériel Section.



Y-Vent Drip Irrigation Set

INTERMITTENT BLADDER IRRIGATION

(*Y-Vent Drip Irrigation Technique*)

Equipment

Sterile Y-vent drip irrigation set:
- Vent drip.
- Glass Y connector.
- 2 Hoffman clamps.
- 1 length rubber tubing 60″ (inflow tube).
- 1 length rubber tubing 48″ (outflow tube).
- Fenwal bottle containing solution as ordered.

Retention catheter.
Catheterization tray.
Sterile gloves.
Lubricating jelly.
Drainage bottle, gallon size.
Rubber stopper, 2-holed, with glass tubes.
Wire Fenwal carrier.
Safety pin.
Standard.

Purpose: To irrigate the urinary bladder at stated intervals for the purpose of removing mucus, pus, blood and irritating products of inflammation and urine decomposition.

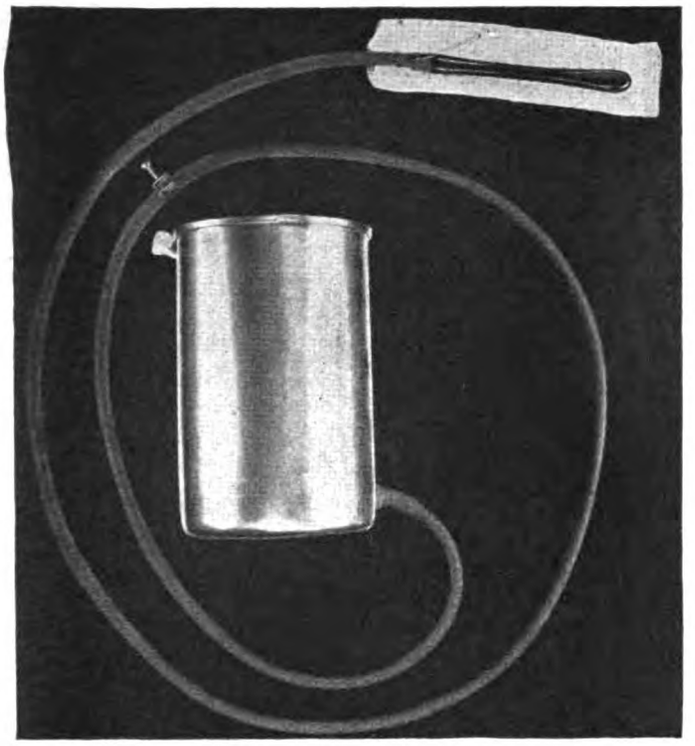
METHOD	IMPORTANT POINTS
A. Preparation of Equipment	
1. Insert the Y-vent drip tube in to the Fenwal bottle. The end of the vent drip must be above the level of the solution in the flask.	Use aseptic technique throughout procedure.
2. Tighten clamp on tubing about 6 inches below the vent drip adaptor. Place flask in Fenwal carrier and suspend on standard.	
3. Connect free end of outflow tubing to the glass tube in the stopper of the drainage bottle.	
4. Expel the air from the irrigating set by allowing the solution to run through the entire set. Close clamps on inflow and outflow tubes.	
B. Procedure	
1. The doctor will insert the retention catheter and connect the irrigating set.	
2. Adjust the standard so that the lower end of the flask is not more than 8 inches above the level of the bladder.	Fluids must be introduced with gentle pressure. The pressure of a column of water is approximately ½ pound per square inch for each foot of elevation.
3. To irrigate the patient's bladder, close the clamp on the outflow tube and open the clamp on the inflow tube. Allow the prescribed amount of solution to flow slowly through the tubing and catheter into the bladder. Close the clamp on the inflow tube. Allow the solution to remain in bladder 1 minute.	The catheter acts as a siphon to empty the bladder.
4. Repeat the procedure until the solution returns clear.	A fluid will flow in a siphon in the direction of least pressure.

5. In the intervals between the irrigations the clamp on the outflow tube must be left open so that the bladder will drain.
   Loop rubber tubing on bed and secure with safety pin. Allow for freedom of movement without tension on the catheter.
6. Record urine output on nurses' notes at the end of each 8 hour period. Compute urinary output by subtracting the total amount of irrigating solution used from the total amount of solution in the drainage bottle.

C. Care of Equipment

1. Soak articles in warm water and Soilex solution for 20 minutes.
2. Rinse in cold running water and dry.
3. Return tray to Centralized Matériel Section.

If the catheter becomes detached from the irrigation set, the air must be expelled from the entire tubing before it is connected.



Vaginal Irrigation Set

VAGINAL IRRIGATION

Equipment

A sterile douche set:
- Irrigating can.
- Rubber tubing, 4′.
- Douche tip.
- Clamp.

Supplied by the ward:
- Rubber sheet and towel.
- Cotton balls.
- Curved basin.
- Paper bag.
- Standard.
- Drop light.

Purpose: To cleanse the vaginal tract and to relieve pain and inflammation.

A. Solutions Used

White vinegar, 12 cc. to 1,000 cc. water.
Lactic acid, 5 cc. to 1,000 cc. water.
Normal saline.
Warm tap water.
Temperature: 105–110° unless ordered otherwise.

B. Administration of Treatment

1. Prepare prescribed solution in irrigating can. Hang can 2′ above bed level.
2. Place patient in dorsal recumbent position on bed pan and drape. Protect bed with rubber sheet.
3. Separate labia and cleanse with flow of solution from douche tip.
4. Insert douche tip with gentle pressure, downward and forward into the vaginal tract for about 2 or 3 inches. Allow water to run in slowly. Rotate douche tip in order to cleanse all parts of the vaginal tract.
5. Withdraw douche tip and dry patient with cotton balls.
6. Record treatment, amount of solution and character of return flow.

C. Care of Equipment

Wash articles, replace on douche set and return to Centralized Matériel Section.

Section V. PROCEDURES FOR LABORATORY DIAGNOSTIC TESTS

ACETONE TEST

Purpose: To determine the presence of acetone in the urine.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. The ward doctor specifies whether the test is to be done on the ward or if the urine specimen is to be sent to the laboratory.	Acetone (the simplest ketone body) is the end product of fat metabolism.
2. If the test is performed on the ward the results are recorded, in duplicate, on Urinalysis, Standard Form 514a. One copy is filed on the patient's chart and one is sent to the laboratory.	Large amounts of acetone in the urine are commonly present in severe diabetes mellitus, in limited carbohydrate intake, in fevers, in gastro-intestinal disorders and after anesthesia. Acetonuria frequently accompanies acidosis.
B. Equipment	
1 urine specimen bottle.	
1 test tube.	This test detects the presence of both acetone and acetoacetic acid, but is more sensitive to the latter. The test should always be done with fresh urine because acetoacetic acid breaks down into acetone and carbon dioxide. If the urine is allowed to stand before it is tested, the findings will not be true values.
1 medicine dropper.	
Glacial acetic acid.	
Sodium nitroferricyanide, supersaturated solution.	
Concentrated ammonium hydroxide, 28% solution.	
Urinalysis, Standard Form 514a, in duplicate.	
C. Procedure	
1. Place 5 cc. of urine in the test tube.	
2. Add 5 gtts. of glacial acetic acid and 5 gtts. of sodium nitroferricyanide and mix.	
3. Tilt tube and carefully overlay solution in the test tube with 2–3 gtts. of concentrated ammonium hydroxide.	
4. Results: A purple or purplish-red ring forms at the contact zone in 2–3 minutes if acetone is present. Brown or orange ring forms if amorphous urates are present in large amounts.	Ring is more purple or violet in low concentrations and more red-purple in high concentrations.

ADDIS SEDIMENT COUNT

Purpose: To determine the amount of formed elements (casts, cells, etc.) present in the urine during a specified 12-hour period.

METHOD

A. General Instructions

1. The Addis test is scheduled in advance with the laboratory.
2. The test must be started at 0700 hours one day and terminated at 0700 hours the following day.

B. Equipment

One 24-hour urine specimen bottle (obtained from laboratory).
Gummed label with patient's name, ward, date, name of test.
Miscellaneous Test or Examination, Standard Form 514m, in duplicate.

C. Procedure

1. Fluids in any form are withheld from 0700 hours on scheduled day through 0700 hours on the following day.
2. Patient may have his usual diet with all liquids excluded.
3. At 1900 hours, on day of test, the patient voids. This specimen is discarded.
4. All urine voided after 1900 hours on day of test up to and including 0700 hours on following day is collected and saved. It is preferable to collect the entire 12-hour specimen at 0700 hours if possible.
5. Send the total specimen with the request slip to the laboratory (Urinalysis Section) immediately upon completion of test.

IMPORTANT POINTS

The number of casts and cells in the urine varies with the type and extent of renal pathology. Casts accompanied by albumin are of special clinical significance and are indicative of degenerative and inflammatory processes in all the renal tissues.

Instruct patient not to void during the night if possible.

ASCHHEIM-ZONDEK TEST

FROG TEST FOR PREGNANCY

Purpose: To diagnose early pregnancy or to differentiate between primary and secondary gonadal disorders through the quantitative determination of gonadotropic hormones.

METHOD

A. General Instructions

1. The ward procedure for these two tests is identical.
2. The tests are scheduled by appointment with the Laboratory.
3. When the test is for the diagnosis of pregnancy the *first* morning urine specimen must be collected.
   Catheterize the patient if necessary.
4. When the test if for gonadotropic hormone determination a total 24-hour urine specimen is required.

B. Equipment

1 urine specimen bottle (for pregnancy tests).
One 24-hour urine specimen bottle (for all other tests).
Miscellaneous Test or Examination, Standard Form 514m in duplicate.
1 gummed label with the patient's name, ward, date and time interval in the case of a 24-hour specimen.

C. Procedure for Pregnancy Test

1. A sample (100 to 200 cc.) of the first morning voiding of urine is saved.
2. Send the specimen and request slips to the laboratory (A–Z Section).

D. Procedure for All Other Tests

1. A 24-hour urine specimen is saved in accordance with the routine procedure for collection.
2. The patient should receive no drugs and all medication orders should be suspended during the period that the urine is being collected.
3. The labeled specimen with the request slip is sent to the laboratory (A–Z Section).

IMPORTANT POINTS

In early pregnancy an excessive amount of the hormone from the anterior lobe of the pituitary gland is produced and excreted in the urine. Injection of this urine into female mice or frogs causes enlargement of the ovaries due to hemorrhages into a graafian follicle or a corpus luteum.
The A–Z (mouse) test is used to detect certain testicular tumors and also hydatidiform moles.

The frog test is used in diagnosing ectopic pregnancy, suspected abortion and normal pregnancy.

No other specimen may be used for this test.

BLOOD CHEMISTRY DETERMINATIONS

Purpose: To determine the concentration of specified chemical substances in the blood.

METHOD

A. General Instructions

1. Blood Chemistry, Standard Form 514d, in duplicate, is sent to the laboratory (Chemical Section) before 1600 hours on the day prior to which the test is requested. Emergency tests are made at any hour. Request slip must be marked EMERGENCY and signed by the doctor requesting the examination.
2. Test days are as specified by the Laboratory Service. These tests are scheduled by the laboratory with the ward.
3. Fasting specimens are required for these examinations.

B. Procedure

1. Food, fluids, and smoking are withheld after 2400 hours prior to blood chemistry tests.
2. Order breakfast delayed until after the test.
3. Specimens for bed patients are collected on the ward by the laboratory technician.
4. Ambulatory patients are sent to the laboratory at the appointed time.

*Milligrams per 100 milliliters of blood.

**Milliequivalent per liter of solution used as a solvent.

IMPORTANT POINTS

Normal range in blood:

Nonprotein nitrogen—20–35 mg. %.*

Urea nitrogen—5–20 mg. %.

Glucose—80–120 mg. %.

Uric acid—M. 4–6.5 mg. %.
F. 3–5 mg. %.

Total cholesterol—150–300 mg. %.

Cholesterol esters — 70–80% of total.

Total protein—5.5–7.8 mg. %.

Albumin—3.2–4.4 Gm. %.

Globulin—2.3–3.4 Gm. %.

Chlorides—575–625 mg. % (97–106 meq./L).**

CO_2 combining power—53–67% (25–30 meq./L).

Calcium—10–12 mg. % (5–6 meq./L).

Phosphorus, inorganic—
2–4 mg. %.
(1.1–2.2 meq./L).

Acid phosphatase—0–1.1 units.

Alkaline phosphatase—2.5–6 units.

Creatinine—1–2 mg. %.

Sodium—133–146 meq./L.

Potassium—3.5–5.0 meq./L.

BLOOD EXAMINATIONS

Hematology

Purpose: To examine the blood and its morphology as an aid in the diagnosis and prognosis in pathological conditions of the blood and blood forming tissues and in following the course of certain injections.

METHOD

A. General Instructions

1. Hematology Standard Form 514b, in duplicate, is sent to the laboratory (Hematology Section).
   Requests for hematocrit, sedimentation rate, blood type and RH factor are ordered separately on individual slips.
2. Appointments are not required for hematology tests with the exception of the fragility test.
3. Request slips for patients unable to go to the laboratory are marked "Bed Patient" and the bed and/or room number is designated.
   Blood specimens for hematology tests are collected from bed patients on specified days.
4. Ambulatory patients are sent to the laboratory for these tests. Patients report with request slips between 0800 and 0930 hours and 1300 and 1500 hours Monday through Friday.
5. Emergency tests may be done at any time. The request slip must be marked "Emergency" and signed by the doctor requesting the examination.
   Blood for emergency examinations is collected by the ward doctor.
   If a report is desired speedily but is not an emergency mark the slip "Today Please."

B. Procedure for Collection of Specimens

1. No special preparation of the patient is required for hematology tests.
2. A blood specimen obtained by venipuncture should always be placed in oxalated tube (designated by a red crayon mark). This tube contains sufficient anticoagulant to prevent 5 cc. of blood from clotting. 5 cc. of blood are withdrawn and placed in the oxalated tube.
   Special tubes marked "P" with a red crayon are provided for Prothrombin time tests. Prothrombin tubes contain oxalate sufficient for exactly 4.5 cc. of blood.
   The tube is then gently rotated 10 or 12 times through a half circle to insure proper mixing of the blood with the anticoagulant.
3. Specimens should be sent to the laboratory immediately after collection.

IMPORTANT POINTS

Normal ranges:

Bleeding time:
2–5 minutes.

Clot retractability:
Complete in 18–24 hours.

Coagulation time:
2–8 minutes (capillary).

Coagulation time:
6–12 minutes (venous).

Erythrocyte indices:
Color, sat. or vol. 0.9–1.1.

Mean corp. hgb.:
27–32 micrograms.

Mean corp. hgb. conc.:
33–36%.

Mean corp. vol.:
80–94 c. microns.

Esoinophiles, total count:
100–250/cu. mm.

Fragility:
0.32–0.34 to 0.40–0.42.

Hematocrit:
42–47 mm.

Hemoglobin:
M. 13.5–15.7 gm./100 cc.
F. 11.8–13.5 gm./100 cc.

Platelets:
5,000,000–1,000,000 (indirect method).

Prothrombin time:
(Compared to normal control.)

Reticulocytes:
0.3–1.0%.

Sedimentation rate:
M. 0–9 mm./hr.
F. 0–20 mm./hr.

BROMSULPHTHALEIN TEST

Purpose: To aid in diagnosing hepatic dysfunction through the ability of the liver to remove bromsulphthalein from the blood.

METHOD

A. General Instructions

1. Nothing by mouth is allowed after 2400 hours prior to the test.
2. The patient is given 5 mgm. of bromsulphthalein dye (B.S.P.) per kilogram of body weight.

B. Equipment

1 syringe, 30 cc.
1 syringe, 10 cc.
2 needles, 20 G, 2″.
Skin preparation tray.
Ampoules B.S.P. dye (obtained from pharmacy).
1 test tube, acid cleaned (obtained from laboratory).
1 gummed label with patient's name, ward, date, test.
Liver and Biliary Function, Standard Form 514j, in duplicate.

C. Procedure

1. The dye is injected intravenously by the ward doctor.
2. A blood specimen (10 cc.) is withdrawn exactly 45 minutes after the injection of the dye.
3. Send specimen with request slips to the laboratory (Chemical Section).

IMPORTANT POINTS

The normal range is less than 5% retention after 45 minutes.

$$\frac{\textit{Weight (lbs.)}}{2.2} \times 5 = \text{dose B.S.P. required.}$$

CONGO RED TEST

Purpose: To detect amyloidosis by measuring the rate of absorption of congo red dye by amyloid deposits.

METHOD	IMPORTANT POINTS
A. General Instructions	
No food and fluids are permitted after 2400 hours on the night prior to the test.	This test is used to diagnose amyloidosis in chronic pulmonary tuberculosis, suppurative diseases and in lipoid nephrosis.
B. Equipment	
1 Ampoule congo red dye, 1% aqueous solution (obtained from pharmacy). 1 syringe, 30 cc. 3 syringes, 10 cc. 4 needles, 20 G, 2″. 4 acid cleaned test tubes with corks. 6 gummed labels with patient's name, ward, date, test, specimen number. Miscellaneous Test or Examination, Standard Form 514m, in duplicate.	The presence of congo red dye in the serum is the normal negative reaction.
C. Procedure	
1. Collect a urine specimen before the dye is injected. Label bottle "Fasting Specimen." The doctor draws 10 cc. of blood in the acid cleaned test tube. Label tube "Fasting Specimen" and specify arm from which blood was obtained.	Should the patient void during the test, save each voiding in a separate container. Record the exact time on the label.
2. The dye is injected intravenously.	
3. Using alternate arms for each specimen, 10 cc. blood are drawn at the following time intervals: Specimen No. 2– 3 minutes. Specimen No. 3–30 minutes. Specimen No. 4–60 minutes.	Blood specimens should be drawn at the exact time intervals if the results are to be accurately compared.
4. Collect a urine specimen after the last blood specimen has been drawn.	
5. Send all specimens, properly labeled, and the request slips to the laboratory (Chemical Section).	

CREATIN TEST

CREATININE TEST

Purpose: To determine renal function by a quantitative measurement of the rate of excretion of creatine and/or creatinine into the urine in relation to a given concentration in the blood.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. The ward procedure for these two tests is identical.	Normal range: Creatine—less than 200 mg. Creatinine—0.6–1.8 Gm.
2. Make appointment for creatine test with laboratory (Chemical Section). The schedule for creatinine tests is as scheduled by the Laboratory Service.	
3. The patient is placed on a purine-free diet for two full days prior to collection of the urine specimens. The purine-free diet is continued for the three days required for the test.	Instruct the patient of the importance of adhering to the purine-free diet.
4. The patient may have water as desired during the test.	
B. Equipment	
3 24-hour urine specimen bottles (from laboratory). Creatin hydrate, 1.32 Gm. (from pharmacy). 3 gummed labels with patient's name, ward, date, test, number of specimen. Blood Chemistry, Standard Form 514d, 3 copies, in duplicate (one set for each specimen).	
C. Procedure	
1. Specimen No. 1: At 0700 hours on the third day of the purine-free diet, have the patient void. Discard the entire specimen. Save all urine voided after 0700 through 0700 hours the following morning. Forward the total specimen, properly labeled, and request slip to the laboratory.	Creatinine is the last of the nitrogenous waste products to accumulate in nitrogenous retention. Accumulation in chronic conditions indicates a grave prognosis. Creatinine retention will remain above normal after recovery from acute kidney pathology if kidney damage has occurred.
2. Specimen No. 2: After specimen No. 1 is closed at 0700 hours, administer creatin hydrate, 1.32 Gm. Save all urine voided up to and including 0700 hours the following morning. Forward the total specimen, properly labeled, and request slip to the laboratory.	Creatine is not usually present in the urine of normal adults. 10–15 mg. daily is regularly found in the urine of children.
3. Specimen No. 3: Collect and save all urine voided after 0700 hours until 0700 hours, inclusive, the following morning. Send the total specimen, properly labeled, and request slip to the laboratory.	

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DUODENAL (BILIARY) DRAINAGE TEST

Purpose: To aid in the diagnosis of biliary tract pathology.

METHOD

A. General Instructions

1. The schedule for amylase tests is as scheduled by the Laboratory Service.
   Make appointment for lipase tests with the laboratory (Chemical Section).
2. The duodenal drainage is performed in the ward.
3. Food, fluids, and medications are withheld for 15 hours prior to the test.

B. Equipment

Rehfuss tube (placed in basin of ice).
1 syringe, 30 cc.
Basin, curved.
Glass of water.
Rubber sheet and towel.
Paper tissues.
5 urine specimen bottles, acid cleaned.
5 gummed labels with the patient's name, ward, test, number of specimen.
1 ampoule magnesium sulphate, 33⅓%.
Beaker of ice.
Gastric Analysis, Standard Form 514f, in duplicate.

C. Procedure

1. Specimen No. 1:
   The Rehfuss tube is passed by the doctor and stomach contents are aspirated. Save 15–40 cc. and place in specimen bottle No. 1.
2. The patient is placed on his right side with the hips elevated 6–8 inches.
3. The patient is instructed to swallow and the tube is advanced about 1 centimeter per minute to the 29-inch marking.
4. Specimen No. 2:
   After the tube is in the duodenum the end of the Rehfuss tube is placed into specimen bottle No. 2.
   Collect 10 cc. of fluid. All specimens are placed in a beaker containing ice.
   If the fluid is cloudy and opalescent discard it and collect the sample when the drippings are clear.
5. Magnesium sulphate, 33⅓%, is instilled by gravity through the barrel of the 30 cc. syringe.
6. Fractional bile specimens are collected in the labeled bottles as follows:
   Specimen No. 3, bile A (light, yellow bile—common duct bile).
   Specimen No. 4, bile B (dark golden bile—gall-bladder bile).
   Specimen No. 5, bile C (light, thin, yellow bile—liver bile).
7. Send specimens with request slips to the laboratory (Chemical Section) as soon as possible.

IMPORTANT POINTS

If bile is found in fasting duodenal contents, it is clinical evidence against the complete obstruction of the common bile duct.

Ordinarily, it takes the tube about 20 minutes to reach the duodenum.

Magnesium sulphate stimulates the flow of bile.

GASTRIC ANALYSIS

(*Fractional*)

Purpose: To analyze the gastric contents in order to measure secretory and motor stomach functioning and to detect indications of intragastric and extragastric pathology.

METHOD

IMPORTANT POINTS

A. General Instructions

1. Food, fluids and medications are withheld after 2400 hours on the night prior to the test. No smoking is permitted until test is completed.
2. The test is scheduled in advance with the laboratory.

Food particles, blood, bile, mucus, pus (very rare) and amount of fasting residium in the stomach contents have important clinical significance.

B. Equipment

Rehfuss or Levin tube (in basin of ice).
30 cc. syringe in a sterile towel.
100 cc. alcohol, 7% (obtained from pharmacy).
Topfer's reagent 0.5% solution (obtained from pharmacy).
Rubber sheet and towel.
Clamp.
Curved basin.
Paper tissues.
5 sterile test tubes.
5 gummed labels with patient's name, ward number, test, ward doctor's name, specimen number, time of collection.
Gastric Analysis, Standard Form 514f, in duplicate.
If histamine is ordered:
Hypodermic syringe with histamine, 0.5 mg.
2 additional sterile test tubes.
2 additional labels.
Sphygmomanometer.

Keep the patient quiet and free from anxiety as psychic disturbances can produce a false achlorhydria.

C. Procedure

1. The doctor passes the Rehfuss or Levin tube.
2. Fasting specimen:
   The stomach contents (about 50 cc.) are aspirated and placed in test tube marked "Fasting Specimen."
3. Alcohol 7%, 100 cc , is instilled by gravity through the tube, using a 30 cc. syringe barrel.
4. Specimen No. 1:
   Thirty minutes after the instillation of alcohol 10 to 15 cc. of gastric content are aspirated and placed in a test tube labeled "Specimen No. 1."
5. Fasting specimen and specimen No. 1 are tested with one or two drops of Topfer's reagent 0.5% solution.
6. If free acid *is present* two additional specimens are withdrawn at 30-minute intervals and labeled No. 2 and No. 3.
7. If free acid *is not present*, histamine 0.5 Gm. is given subcutaneously (ordered by the doctor).
8. Measure the blood pressure and pulse before and 10 minutes after administration of histamine. Record on the remarks column of the laboratory request slip.
9. Thirty minutes after the administration of histamine 3 more specimens are withdrawn every 30 minutes.
10. Forward all specimens to the laboratory with the request slip for quantitative determination of free and total acidity.

The teeth should not be brushed on the morning of the test to exclude any possibility of swallowing blood. Even traces of blood from trauma may interfere with clinical interpretation.
Gastric contents are normally acid due to free hydrochloric acid in the gastric juice.

Free acid produces a red or pink solution .
All specimens should be no less than 10 cc in volume.
A yellow solution indicates the absence of free acid. Histamine is a powerful secretory stimulant. It may produce headache, dizziness, itching, burning, local swelling and urticaria. Fall in blood pressure and shock is possible.

GASTRIC WASHING

Purpose: To analyze the stomach contents for tubercle bacilli.

METHOD

A. General Instructions

1. The test is performed on the ward. It may be scheduled Monday through Friday. (Check schedule with Laboratory Service.)
2. Send the specimen to the Laboratory immediately as tubercle bacilli are destroyed in a short time by gastric enzymes.
3. Food, fluids and smoking are not permitted after 2200 hours prior to the test.

B. Equipment

Levin tube in a bowl of ice.
Curved basin.
Rubber sheet and towel.
Glass of water.
1 syringe, 30 cc.
Urine specimen bottle and cap.
Gummed label with patient's name, ward, date, test, hour of collection.
Sputum and Gastric Contents, Standard Form 514e, in duplicate, with tubercle bacilli examination checked.

C. Procedure

1. Question the patient as to whether he has had anything by mouth or has smoked since 2200 hours.
2. The Levin tube is introduced preferably through the nostril.
3. The entire stomach contents are aspirated and placed in specimen bottle. If no secretions can be obtained and it is certain that the tube is in the stomach, allow the patient to relax awhile then try aspirating again.
4. Send to the laboratory (Bacteriology Section) with the requests slips. The specimen bottle should not be contaminated on the outside with gastric washings. Caution the messenger to handle the specimen with care.

IMPORTANT POINTS

Bacteriologically, the only important examination of gastric washings is for tubercle bacilli. Gastric washings often contain tubercle bacilli even though there is little or no sputum.

The Levin tube should not be lubricated. It should be ice cold when it is introduced into the patient.

GLUCOSE TOLERANCE TEST

Purpose: To aid in diagnosing hepatic dysfunction by determining if there is failure of glycogen storage in the liver with increased or prolonged glycogenolysis.

METHOD

A. General Instructions

1. The laboratory schedule for this test is as scheduled by the Laboratory Service. Make appointment for the test well in advance with laboratory (Chemical Section).
2. The test is performed on the ward. The test must be completed and all specimens in the laboratory by 1200 hours.
3. The diet should contain at least 300 Gm. of carbohydrates for 3 days prior to the test.
4. On the day prior to the test obtain 5 sodium fluoride tubes and a weighed amount of glucose from the laboratory (Chemical Section).
5. Withhold all food and fluids after the evening meal. Smoking is not permitted and the patient should avoid any exercise.

B. Equipment

5 sodium fluoride test tubes.
5 urine specimen bottles.
5 syringes, 10 cc.
5 needles, 30 G, 2″.
5 gummed labels with patient's name, ward, test, number of specimen.
Skin preparation tray.
Miscellaneous Test or Examination, Standard Form 514m, in duplicate.

C. Procedure

1. At 0700 hours mix the measured quantity of glucose in 400 cc. of water (flavored with lemon juice) and chill.
2. Specimens No. 1—Fasting specimen.
   Collect specimen of urine. The doctor draws 5 cc. blood specimen.
3. The patient is given 400 cc. glucose solution to drink within 10 minutes.
4. Blood and urine specimens are collected at the following time intervals:
   Specimens No. 2—½ hour after fasting specimen.
   Specimens No. 3—1 hour after fasting specimen.
   Specimens No. 4—2 hours after fasting specimen.
   Specimens No. 5—3 hours after fasting specimen.
5. Send the five urine and five blood specimens, labeled with the exact time of collection, and request slips to the laboratory (Chemical section).

IMPORTANT POINTS

This test is based on the assumption that disturbances of the liver in relation to carbohydrate metabolism are sufficient for indicating dysfunction of the liver as a whole.

Specimens must be collected at the exact time intervals.

HIPPURIC ACID TEST

Quick's Method

Purpose: To measure the detoxifying and metabolic functions of the liver based upon the conversion of sodium benzoate (by conjugation with glycine in the liver into hippuric acid), which is excreted in the urine as sodium salt.

METHOD

A. General Instructions

1. Make appointment for this test with the laboratory (Chemical Section).
2. Food and fluids are withheld after 2400 hours prior to the test. A light breakfast of cereals or dry toast with coffee, tea, or milk is given the morning of the test. No other fluids are allowed.

B. Equipment

4 urine specimen bottles.
Sodium benzoate, 6.0 Gm., dissolved in 30 cc of water.
4 gummed labels with the patient's name, ward, test, hour of collection of the specimen.
Liver and Biliary Function, Standard Form 514j, in duplicate.

C. Procedure

1. At 0600 hours have the patient void and discard the specimen.
2. Immediately after the voiding, administer orally 6.0 Gm. of sodium benzoate dissolved in 30 cc. of water. Follow with 100 cc. of water.
3. All urine voided during the next 4 hours is collected at the following intervals and properly labeled:
   Specimen No. 1—0700 hours.
   Specimen No. 2—0800 hours.
   Specimen No. 3—0900 hours.
   Specimen No. 4—1000 hours.
4. Send the specimens with request slip to the laboratory (Chemical Section).

IMPORTANT POINTS

The test is contraindicated if renal impairment exists since hippuric acid in the urine may be caused by kidney dysfunction.

HOLLANDER INSULIN TEST

Gastric Analysis With Insulin

Purpose: To determine (1) the amount of free acid in the stomach, and (2) to determine whether any functionally effective, secretory nerve fibers are stimulating gastric secretion following vagotomy.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. An appointment for the Hollander insulin test must be scheduled in advance with the laboratory (Chemical Section).	Hypoglycemia stimulates the vagus nerves which in turn stimulate gastric secretions.
2. A 12-hour night gastric secretion may precede the Hollander insulin test. This is ordered by the doctor.	The results of the test are of no value unless the blood sugar falls below 50 mg. per 100 cc. of blood at some time during the test.
B. Equipment	
Wangensteen suction apparatus (if the 12-hour night gastric secretion is taken). Levin tube equipment (if the 12-hour night gastric secretion is not taken). 1 ampoule regular insulin, U 40. 1 insulin syringe and needle, 26 G, ½″. 9 test tubes, acid cleaned (obtained from laboratory). 4 test tubes, fluoride (obtained from laboratory). 4 syringes, 10 cc. 4 needles, 20 G, 1½″. 1 ampoule glucose, 50%. 1 syringe, 30 cc., and needle, 20 G, 1½″. 13 gummed labels with patient's name, ward, date, test, time taken and number of specimen. Miscellaneous Test or Examination, Standard Form 514m, in duplicate.	The vagotomy is incomplete if there is a definite increase in both gastric secretions and gastric acidity. There is no correlation between the amount of acidity and the number of nerve fibers cut. Adequate hypoglycemia with no response suggest complete vagotomy. Postoperative gastritis, fever, regurgitation of the intestinal contents or any interference with the secretory glands can produce the same result. If there is any doubt, it can be ruled out or established by a gastric analysis with histamine.
C. Standard Procedure for 12-Hour Night Gastric Secretion	
1. The patient is given a liquid supper at 1700–1800 hours. 2. At 2000 hours the Levin tube is passed. Stomach contents are completely aspirated and discarded. The Levin tube is connected to the Wangensteen suction apparatus and constant suction is maintained for 12 hours (until 0800 hours). 3. At 0800 hours measure and record the amount of drainage. 4. Send a 10 cc. specimen to the laboratory (Chemical Section) for free and total acid determination.	
D. Procedure for Hollander Insulin Test	
1. At 0800 hours aspirate stomach contents. Measure and record volume. Place a 10 cc. sample in a test tube. Label "Fasting." (This step is omitted if 12-hour gastric secretion has been performed as above.)	
2. At 0800 hours 5 cc. of blood is withdrawn and placed in the fluoride test tube. Label "Specimen No. 1, Fasting."	$\frac{\text{Weight (lbs.)}}{2.2} = \text{Kg.}$
3. At 0800 hours, immediately after the blood specimen has been withdrawn, the doctor administers intravenously 0.3 units regular U 40 insulin per Kg. of body weight.	Kg. × 0.3 = Amount of regular U 40 insulin required.
4. Three blood specimens (drawn every 30 minutes) and eight gastric samples (obtained every 15 minutes) are obtained in addition to the fasting specimens. The schedule for obtaining all specimens is as follows:	This dosage of insulin can produce severe signs and symptoms of insulin shock. Glucose, 50% for intravenous administration should be available.

METHOD

IMPORTANT POINTS

Gastric Contents—10 cc.		*Blood—5 cc.*
Specimen No. 1 Fasting	0800	Specimen No. 1 Fasting
Specimen No. 2	0815	
Specimen No. 3	0830	Specimen No. 2
Specimen No. 4	0845	
Specimen No. 5	0900	Specimen No. 3
Specimen No. 6	0915	
Specimen No. 7	0930	Specimen No. 4
Specimen No. 8	0945	
Specimen No. 9	1000	

5. Send the 4 blood specimens and the 9 gastric specimens to the laboratory with the request slips. The gastric contents are to be examined for free and total acid. The blood is to be examined for sugar.

KEPPLER TEST FOR ADDISON'S DISEASE

Purpose: To determine adrenal cortex insufficiency.

METHOD

A. General Instructions

1. The test is scheduled in advance with the laboratory (Chemical Section).
2. The test consists of two parts; the second to be performed only in case of a positive water tolerance test.
3. On the day prior to the test give the patient his usual diet but with no added salt.
4. All food and fluids are withheld after 1800 hours until the test is completed.
5. The test is begun after the evening meal and continued until 1230 hours the following day.
6. The patient should be instructed on the requirements of the test.

B. Equipment

4 urine specimen bottles.
1 large urine specimen bottle (obtained from laboratory).
1 test tube, oxalated (obtained from laboratory).
5 gummed labels with patient's name, ward, test, time of collection.
Miscellaneous Test or Examination, Standard Form 514m, in duplicate.

C. Procedure for Part I (Water Tolerance Test)

1. At 2230 hours on the day prior to the test have the patient void. Discard the specimen.
2. Night specimen:
   All urine voided after 2230 hours up to and including 0730 hours is saved in the large specimen bottle.
3. Have the patient void at 0830 hours. Discard the specimen.
4. Weigh the patient. Give him a measured amount of water to drink within 45 minutes. (9 cc. of water per pound of body weight.)
5. Specimens are collected in separate containers at hourly intervals as follows:
   Specimen No. 1—0930 hours.
   Specimen No. 2—1030 hours.
   Specimen No. 3—1130 hours.
   Specimen No. 4—1230 hours.
6. Make notations on the request slip of any specimens which are not obtained.
7. Note the volume of each hourly specimen. If the volume of the largest hourly specimen is less than the volume of the total night specimen, Part II of the test must be done.

D. Procedure for Part II

1. Immediately after the 1230 hour urine specimen has been collected and while the patient is still fasting, draw 10 cc. of blood into an oxalated test tube.
2. Send blood and urine specimens to the laboratory (Chemical Section) for urea nitrogen, chlorides, urine urea nitrogen and urine chlorides determinations.

IMPORTANT POINTS

The test is positive if the volume of the largest hourly urine specimen is less than the volume of the night specimen. Addison's disease may be present.
Part II of the test is required if the test is positive.
The test is negative if the volume of urine of any single hourly specimen exceeds the volume of the night specimen.

PHENOLSULFONPHTHALEIN (P. S. P.) TEST

Purpose: To test the functional capacity of the kidneys through a quantitative measurement of the amount of phenolsulfonphthalein dye eliminated within a stated time.

METHOD

A. General Instructions

1. Food and liquids are allowed as usual prior to the test.
2. If the patient has a known or suspected urine residual, a catheter should be passed for the duration of the test. The catheter is kept clamped during the intervals between the collection of specimens.
3. The presence of blood in the urine does not contraindicate the test, but this should be noted on the request slip.
4. The urine specimens must be collected at the specified time. The reliability of the findings is dependent upon exactness in the collection of the specimens.
5. The procedure outlined below will be followed unless specifically ordered otherwise by the doctor. Record on the request slip the time intervals which were substituted.
6. The specimens are sent to the laboratory (Chemical Section) before 1200 hours.

B. Equipment

4 urine specimen bottles.
1 specimen bottle containing 4 cc. sodium hydroxide. 10%.
Skin preparation tray.
1 syringe, 2 cc. or tuberculin.
1 needle, 20 G, 2″.
1 ampoule P. S. P. dye.
4 gummed labels with patient's name, ward, date, test, hour, and specimen number
Renal Function, Standard Form 514L, in duplicate.

C. Procedure

1. The patient voids and the specimen is discarded.
2. The patient is given 3 glasses of water to be finished at the end of 20 minutes.
3. Ten minutes after the patient has drunk the water, the doctor administers exactly 1 cc. of dye intravenously.
4. Exactly 5 minutes after the injection of the dye instruct the patient to void a *very small amount* of urine in the unlabeled bottle containing 4 cc. of sodium hydroxide. *Record* on the laboratory request slip whether or not a red color is produced. Save this "appearance time specimen" and add it to specimen No. 1 when it is collected.
5. Urine specimens are collected at the following intervals after the injection of the dye:
   Specimen No. 1–15 minutes.
   Specimen No. 2–30 minutes.
   Specimen No. 3–60 minutes.
   Specimen No. 4–120 minutes.
   Record on Standard Form 514L the time the dye was injected and the exact time each specimen was collected.
6. Send the specimens to the laboratory (Chemical Section) with the request slips.

IMPORTANT POINTS

Phenolsulfonphthalein dye is eliminated only by the kidneys, through glomerular filtration and tubular excretion. About 40% of the dye is normally retained in the liver.

The normal rate of excretion is 55–75% in 2 hours. The first 15 minutes specimen should contain 25% or more of the dye.

The test is important in the diagnosis and prognosis of nephritis.

The elimination of dye is low in cardiac disease with chronic passive kidney congestion.

If renal function is normal, evidences of the dye will appear in the urine within 3 to 5 minutes.

SMEARS AND CULTURES

Purpose: To obtain clinical specimens for microscopic identification of bacteria by means of the smear or the culture technic.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. Specimens are usually obtained by the doctor.	
2. The source of the specimen and the specific test desired should always be specified on the laboratory request slip.	
3. All specimens should be obtained directly from the infected area.	Nose cultures should not be made within an hour after the application of antiseptics.
4. Extreme care should be exercised in the handling (and transporting) of smears and cultures to prevent contamination of the individual and of the specimen itself. Place a piece of an applicator stick across either end of the smeared slide. Cover with a clean slide and secure with a rubber band. Culture tubes should be tightly stoppered with the sterile cotton in the mouth of tube.	Eye cultures should not be made for several hours after irrigations or the instillation of antiseptics.
5. Slides and culture tubes must be carefully labelled with the patient's name, ward, and test to prevent mistakes or loss.	
6. Specimens for culture should be delivered to the laboratory as soon as possible as they are of no value if they are allowed to dry.	
B. Equipment	
Culture tubes (obtained from C. M. S.). Glass slides and covers (obtained from ward laboratory). Tongue depressor. Flashlight. Gummed labels with patient's name, ward, date, hour. Miscellaneous test or Examination, Standard Form 514m, in duplicate.	

SPUTUM SPECIMEN

Purpose: To examine the exudates from the lungs, bronchi or trachea raised by forceful coughing.

METHOD

A. Procedure

1. Sputum may be routinely sent to the laboratory Monday through Friday. Specimens should be sent to the laboratory before 0900 hours.
2. When a series of three consecutive 24-hour specimens are ordered, start series so that the final specimen will be received by laboratory at 0900 hours on Wednesday, Thursday, or Friday.
3. If a series is started and patient is unable to produce sputum, an effort should be made to complete the series within 5 days from time the first 24-hour specimen was submitted.
4. Sputum should be expectorated directly into the regulation sputum boxes. Instruct patient to collect only material raised by coughing without admixture with saliva or secretions from nose and throat.
   Secure lid on box and place container in a paper bag.
5. Send specimen with Sputum and Gastric Contents, Standard Form 514e, in duplicate, to laboratory (Bacteriology Section). Indicate on request slip the specific studies or examinations desired. The container should not be contaminated exteriorly with sputum. Caution messenger to handle the specimen with care.

IMPORTANT POINTS

Patient should be instructed as to proper method for collecting sputum. In certain chronic respiratory conditions there may be no cough but only small masses of sputum rising in the pharynx and which are usually swallowed.

STOOL SPECIMEN

Purpose: To examine the feces for intestinal parasites, ova, pathogenic bacteria or chemical constituents.

METHOD

A. General Instructions

1. Examination of stool specimens requires special arrangements previously made with the laboratory (Parasitology Section)
2. Send ambulatory patients to the laboratory (Parasitology Section) to pass the specimen.
3. Collect 24-hour stool specimen in special large stool specimen container.
4. Stool specimens should not be contaminated with urine.
5. Specimens containing barium oil or obtained by enema can not be used for parasitic examination.

B. Equipment

Container for stool specimen.

Gummed label with patient's name, ward, date, hour of defecation.

Feces, Standard Form 514g, in duplicate, with the desired examination checked.

C. Procedure

1. Single specimen:
   Have the patient pass the stool directly into the specimen box if possible.
2. 24-hour specimen:
   Collect and save all stools passed during a 24-hour period.
3. Warm specimen:
   Have the patient pass the stool directly into the specimen box if possible.
   Place the box, immediately after defecation, on a hot water bottle and send promptly to the laboratory.
   If a bedpan is used, it must be clean, dry and comfortably warm (but not hot). Place it on a hot water bottle and send promptly to the laboratory.
4. Send all specimens with the request slip to the laboratory immediately after defecation.

IMPORTANT POINTS

The amount, form, consistency, color, odor, reaction and presence of mucus in the feces are of clinical value.

Examinations are made for occult blood, bilirubin, urobilin and urobilinogen, remnants of food, cellular exudates, erythrocytes and parasites.

Generous stool specimens are necessary for microscopic examination in order that suspicious portions may be selected by microscopic screening.

UREA CLEARANCE TEST

Purpose: To determine the ability of the kidneys to excrete urea by comparing the concentration of urea in the blood with the rate of excretion in the urine during a fixed time.

METHOD

A. General Instructions

1. The schedule for urea clearance test is as scheduled by the Laboratory Service. The request slip is sent to the laboratory before 1600 hours the preceding day and before 1000 hours on Saturday for Monday appointments.
2. Ambulatory patients are sent to laboratory at the scheduled time on the appointed day.
3. If test is done on the ward specimens must be sent to the laboratory not later than 1200 hours.
4. The patient may have usual breakfast without beverage and fruit juice.
   Further foods and fluids are restricted until the test is completed.

B. Equipment

2 urine specimen bottles.
1 blood specimen tube, oxalated (obtain from laboratory).
3 gummed labels with patient's name, ward, test, time, number of specimen.
1 syringe, 10 cc.
1 needle, 20 G, 2″.
Skin preparation tray.
Miscellaneous Test or Examination, Standard Form 514m, in duplicate.

C. Procedure

1. The patient drinks 400 cc. water at 0800 hours. Instruct the patient to void. Make a notation of the exact time of voiding. Discard the specimen.
2. Specimen No. 1:
   The patient voids at 0900 hours.
   The entire specimen is saved. Record on the bottle label the exact time specimen was collected.
3. The patient drinks 200 cc. water immediately after voiding.
4. The doctor draws 5 cc. blood specimen for blood, urea, nitrogen determination. Record the exact time on the label.
5. Specimen No. 2:
   The patient voids at 1000 hours.
   The entire specimen is saved. Record the exact time specimen was collected.
6. Send the 2 urine specimens and the blood specimen with the request slips to the laboratory (Chemical Section).

IMPORTANT POINTS

Urea is the chief nitrogenous constituent of urine and the end product of protein metabolism.
Less than 70% excretion of urea indicates impaired renal function. 10% or less is found in terminal nephritis or uremic coma.

Accuracy in determining the degree of impaired renal function is dependent upon the bladder being completely emptied at each voiding. If the patient has a known or suspected residual, a catheter should be passed for the duration of the test.
Early indications of urea retention are usually observed in the urine before evidences of it are found in the blood.

URINE CONCENTRATION TEST

Fishberg Method

Purpose: To determine renal function in the elimination of solids as gauged by the specific gravity of urine voided during a specific period following controlled fluid and food intake.

METHOD

A. General Instructions

1. The schedule for urine concentration tests is as scheduled by the Laboratory Service.
2. Withhold all fluids after the noon meal of the day prior to the test.
3. The evening meal consists of a high-protein, dry diet and a measured amount of fluid (200 cc.).
4. The patient remains in bed from bedtime the night before the test until the test is completed.
5. The patient voids before retiring. Discard this specimen and any urine subsequently voided during the night until 0700 hours.

B. Equipment

3 urine specimen bottles.
3 gummed labels with the patient's name, ward, test, time, number of the specimen.
Renal Function, Standard Form 514L, in duplicate.

C. Procedure

1. Urine is collected and the entire specimen is saved, in separately labeled bottles, at the following intervals:
   Specimen No. 1—0800 hours.
   Specimen No. 2—0900 hours.
   Specimen No. 3—1000 hours.
2. Note the exact time on request slip if a specimen is obtained at a time other than appointed hour.
3. Send the specimens with request slip to the laboratory (Chemical Section).

IMPORTANT POINTS

The test is a measure of total renal functional capacity only at the time of the test. Evidences of dysfunction may be only temporary.

In chronic kidney pathology repeated tests are valuable in predicting prognosis.

URINE CONCENTRATION TEST

Modified Mosenthal Method

Purpose: To determine the concentration ability of the kidneys as gauged by the specific gravity and volume of urine excreted.

METHOD

A. General Instructions

1. The test is scheduled for completion after verification of schedule with the Laboratory Service. The test requires 24 hours.
2. On the day prior to and on the day of the test, the patient is given a regular diet with 1 pint of liquids at each meal. Nothing by mouth is permitted between meals.
3. The entire specimen of each voiding must be saved.

B. Equipment

One 24-hour urine specimen bottle (for night specimen, obtained from laboratory).
6 urine specimen bottles.
7 gummed labels containing patient's name, ward, name of test, date, hour of collection of specimen.
Renal Function, Standard Form 514L, in duplicate.

C. Procedure

1. On the day of the test, meals should be served promptly at 0800, 1200, and 1700 hours.
2. Have the patient void immediately before breakfast (0800 hours). Discard this specimen.
3. The patient voids and the entire specimen is saved in separate bottles at the following intervals:
   Specimen No. 1—1000 hours.
   Specimen No. 2—1200 hours.
   Specimen No. 3—1400 hours.
   Specimen No. 4—1600 hours.
   Specimen No. 5—1800 hours.
   Specimen No. 6—2000 hours.
   Night specimen—2000–0800 hours (all urine voided after 2000 hours until 0800 hours is saved in the large specimen bottle).
4. Send all specimens to the laboratory with the request slips after the night specimen has been closed.

IMPORTANT POINTS

Normally, the volume and specific gravity of urine varies considerably at different periods during the day. This shows the ready response of the normal kidneys to meet the varying demands for elimination of water and solids.
The pathological kidney loses this adaptive power to a greater or lesser degree and the urine excreted is of almost uniform concentration from hour to hour.

Normal ranges:
The specific gravity of one day-urine specimen will exceed 1.018 and the difference between the highest and lowest specific gravities will not be less than 8–9 points.
The volume of the night specimen will be 250–500 cc. with a maximum of 750 cc. and with a specific gravity of about 1.018.
Specimen No. 6 must not be collected before 3 hours have elapsed after the beginning of the evening meal.

URINE DILUTION TEST

Purpose: To determine the capacity of the kidneys to dilute urine during a specified time following a controlled intake of fluids.

METHOD

A. General Instructions

1. The schedule for urine dilution tests is as scheduled by the Laboratory Service.
2. All food and fluids are withheld after 2400 hours prior to the test until after its completion.
3. The patient remains in bed until the test is completed.

B. Equipment

6 urine specimen bottles.

Gummed labels with the patient's name, ward, test, time, number of specimen.

Renal Function, Standard Form 514L, in duplicate.

C. Procedure

1. Instruct the patient to void at 0800 hours. Discard the urine.
2. The patient must drink 1500 cc. of tap water within the next 30 minutes.
3. The patient voids at the following intervals and the entire specimen is saved in separately labelled bottles:
   - Specimen No. 1—0900 hours.
   - Specimen No. 2—0930 hours.
   - Specimen No. 3—1000 hours.
   - Specimen No. 4—1030 hours.
   - Specimen No. 5—1100 hours.
   - Specimen No. 6—1200 hours.
4. Send the specimens with the request slips to the laboratory (Urinalysis Section) promptly after the last voiding.

IMPORTANT POINTS

This test is primarily a measure of the blood supply to the kidneys by determination of the renal water excretory function.

In the event an additional bottle is necessary to hold all of the specimen, label the second bottle to correspond with the proper specimen number.

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FRACTIONAL URINE EXAMINATION FOR SUGAR

Purpose: To determine the quantity of sugar present in the urine immediately prior to the ingestion of food and before retiring.

METHOD

A. General Instructions

1. The urine is analyzed on the ward unless ordered otherwise.
2. Specimens should be collected exactly one-half hour before meals and at 2100 hours.

B. Equipment

1 urine specimen bottle.
1 test tube.
1 medicine dropper.
Clinitest tablets.
Clinitest color scale.
Diabetic Record, Med. Dept. Form 55G-2.

C. Procedure

1. Place 10 gtts. of water in a chemically clean test tube.
2. Add 5 gtts. of urine to the water in the test tube.
3. Drop one Clinitest tablet into the solution in the test tube and allow the solution to stand for 5 minutes.
4. Compare the color of solution in the test tube with the Clinitest Color Scale. Results are interpreted as follows:

Blue	—	negative
Green	+	1 plus
Yellow	++	2 plus
Orange	+++	3 plus
Brick red	++++	4 plus

5. Record the results of the test on the patient's diabetic record.

IMPORTANT POINTS

The results of this test are used in the calculation of insulin dosage.

ROUTINE URINE EXAMINATION

Purpose: To determine by means of qualitative analysis the presence of abnormal findings in the urine.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. The first voided specimen is collected routinely on all patients the morning after admission. Should the day after admission fall on a Saturday, Sunday or holiday withhold collection of the specimen until Monday morning or the morning after the holiday.	The first morning specimen is the most desirable because specimens voided during the day are likely to contain varying amounts of glucose or albumin.
2. Routine admission urine specimens must be sent to the laboratory prior to 0930 hours. Urine specimens other than for routine analysis may be sent at any time. The request slip must be marked EMERGENCY and signed by the doctor ordering it.	
B. Equipment	
Urine specimen bottle. Urinalysis, Standard Form 514a, in duplicate. Check specific gravity, albumin, sugar, microscopic.	Urine specimen bottles should be chemically clean to avoid the possibility of carrying over traces of albumin and sugar.
C. Procedure	
1. Collect the first morning specimen. Give the ambulatory patient a urine specimen bottle the previous evening and instruct him to void the first morning specimen into the bottle.	A specimen contaminated with feces or menstrual discharges is not acceptable for examination.
2. Secure request slip to bottle with a rubber band and send to laboratory (Urinalysis Section).	

ROUTINE 24-HOUR URINE EXAMINATION

Purpose: To determine by means of quantitative analysis the total count of wastes eliminated by the kidneys during a 24 hour period.

METHOD	IMPORTANT POINTS
A. General Instructions	
1. The usual diet and fluids are given unless contraindicated in the routine of any special test for which the specimen is being collected.	
2. The urine is kept refrigerated only if so ordered.	Avoid freezing refrigerated urine specimens.
3. The urine is collected during a 24-hour period beginning and ending at 0800 hours. The test must be started in sufficient time so that it will not be terminated on a Saturday, Sunday, or holiday except in cases of emergency.	
B. Equipment	
One 24-hour urine specimen bottle (with preservative if ordered) obtained from laboratory.	Information regarding preservative may be obtained from the Laboratory Service manual.
Gummed label containing the patient's name, ward, date, name of test.	
Urinalysis, Standard Form 514a, in duplicate. Check examination requested.	The specimen bottle must be chemically clean.
C. Procedure	
1. Instruct the patient regarding the collection of the specimens.	In order that a quantitative urine examination may have clinical value, an examination must be made of a sampling of the total urine excretion during a 24-hour period.
2. At 0800 hours have the patient void. This specimen is discarded.	
3. All urine voided during the following 24 hours is saved in the large specimen bottle.	
4. The collection is terminated with the final voiding at exactly 0800 hours, 24 hours after the test was started.	
5. Send the entire specimen and request slips to the laboratory immediately.	

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[AG 700.3 (23 Sep 53)]

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